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CANADIAN MILITIA
FIELD ARTILLERY MANUAL
1878
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MANUAL

FOR THE

MILITIA ARTILLERY OF CANADA.

PART 1.—FIELD ARTILLERY.

PART 2.—GARRISON & SIEGE ARTILLERY.

PART 3.—PRINCIPLES OF GUNNERY, LABORATORY, FORTIFICATION AND SURVEYING.

PUBLISHED BY AUTHORITY.

Gunnery School Press,
1875.

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GENERAL ORDER.

Head Quarters, Ottawa,
January, 1875.

The Major General Commanding Canadian Militia, having approved of the Instructions contained in the "Manual of the Militia Artillery Exercises," desires that they may be strictly adhered to throughout the Dominion.

He also directs that every Officer of the Militia Artillery shall provide himself with a Copy of such parts as apply to his own branch of Artillery service.

By order,

WALKER POWELL, Lieut. Col.,
Dep. Adj. Gen., Head Quarters.

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PREFACE.

It is desirable to have an uniform system of Artillery instruction throughout the Dominion, as closely as possible in accordance with that of the Royal Artillery, but the excellent text books of the latter distinguished service, are more scientific, voluminous, and costly, than is considered necessary for the militia artillery of Canada. They treat of varied drills and exercises, and describe armaments, some of which are becoming obsolete, and others not yet introduced or likely to be supplied to Canada. The information required for a militia artilleryman is, therefore, diffused through many books and manuals difficult of ready reference, and confusing to a non-professional artillerist, whose time is limited, as his periods of instruction are short, and, of necessity, interrupted by civil occupations, such valuable and expensive works as the following, being seldom within his reach.

Owen's Modern Artillery.

Treatise on Ammunition, Parts I. and II.

Text book of Rilled Ordnance.

 " " on Theory of Motion of Projectiles.

Cape's Mathematics.

Notes on Gunpowder.

Notes on Laboratory department.

Notes on Gun factory department.

Notes on Carriage department.

Griffith's Manual of Artillery.

Artillery Retrospect, 1870.
 Handbook for Field service.
 Minor Tactics of Field Artillery.
 Short Notes on Field Batteries.
 Standing Orders of the Royal Artillery.
 Manual of Artillery Exercises, in 8 parts.
 Manual of Field Artillery, in 12 parts.

The latter has not been re-published since 1861, and is now out of print, there has been, in the interval, a revolution in the material and the application of Artillery.

The present object is to condense, as far as is consistent with simplicity. The above works are freely made use of, changes are as much as possible avoided, and nothing essentially at variance with the present practice of the Royal Artillery is introduced.

Land service artillery will be broadly considered as—

- 1st. Field.
- 2nd. Siege.
- 3rd. Garrison.

The distinctive character of the first is *mobility*, of the last *stability*, or tenacity in holding its ground.

Siege artillery holds an intermediate place between the two.

Artillery instruction will be divided into—

- Technical.
- Tactical.
- Disciplinary.
- Scientific.

The two last can only be slightly touched upon in a work like the present.

The Scientific instruction will, therefore, be limited at first, to a clear explanation of elementary gunnery, suit-

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able to intelligent Non-commissioned officers, subsequently to be extended to Range finding and rough Surveying, as well as such elementary Fortification as is absolutely necessary for the requirements of an Artillery officer.

The Technical will include the gun and its ammunition, use, and rules for practice.

The Tactical will be comprised of drill :

1st. As a steadying training exercise for men and horses.

2nd. As training to surmount obstacles.

3rd. Artillery tactics proper : the movements, selection of position, and working of guns before an enemy.

The Disciplinary portion will include the care and management of men and horses.

I have been assisted in various portions of this work by

Major Irwin, Capt. R. A., Asst. Inspector of Artillery and Commandant G. S., Kingston

Capt. Prevost, Adj. G. S.

Capt. Holmes, Adj. G. S.

Master Gunner Donaldson, R. A.

Asst. Inst. of Gunnery Clifford, R. A.

" " " Bramah, P. A. }

Staff of
the Gunnery
Schools.

T. BLAND STRANGE,

Major, R. Art.,

Lieut. Col. and Inspector of Artillery,
for the Dominion.

Citadel, Quebec, 1875.

The following abbreviations will be found in this work:—

- G. S. for General Service.
- S. S. for Sea Service.
- L. S. for Land Service.
- M. L. for Muzzle-Loading.
- B. L. for Breech-Loading.
- S. B. for Smooth Bore.
- M. L. O. for Muzzle-Loading Ordnance.
- B. L. O. for Breech Loading Ordnance.
- M. L. R. O. for Muzzle-Loading Rifled Ordnance.
- B. L. R. O. for Breech-Loading Rifled Ordnance.
- S. A. for Small Arm.

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TECHNICAL.

SECTION 1.—The Gun, Ammunition, and Carriage.

THE GUN.

Designation.—Ordnance, wrought-iron, rifled, M. L. 9 Por. 8 cwt.

Length,	nominal	-	-	5 feet 8½ inches.
	total	-	-	6 feet.
	of bore	-	-	5 feet 3½ inches.
	of rifling	-	-	4 feet 11½ inches.
Preponderance	-	-	-	7 lbs.
Calibre	-	-	-	5 inches.
Nominal weight	-	-	-	8 cwt. 1 qr. 6 lbs.
Grooves	-	-	-	3. French modified.
Twist of rifling, uniform	-	-	-	1 in 30 calibres.
Initial Velocity	-	-	-	1,331 feet.

CONSTRUCTION.—The 9 Por. Muzzle-loading Rifle gun consists of two pieces—one shrunk over the other—the “A tube” or “barrel,” and the “breech coil.”

The “A tube” which extends the whole length of the gun, is formed from a cylinder, or ingot, of cast-steel, bored and turned to the proper dimensions, after being toughened in a “bath” of oil.

The “breech coil” is of wrought-iron and is composed of two pieces, welded together, the part in rear of the trunnions being manufactured from bar-iron, which is coiled round a mandril and welded, the fibre of the iron running round in the direction of the length of the bar, whilst the part from close behind the trunnions to the front, is forged solid, this latter piece after being rough turned and bored, is welded to the coil.

The “breech coil” takes the form of a jacket to the “barrel,” the two pieces having been turned and bored to the proper dimensions, the “breech coil” is expanded by heat, and then lowered over the “barrel” which is placed in a vertical position to receive it, the coil on being allowed to cool contracts so as to grip the barrel, the two pieces, in a measure, thus becoming one.

SIGHTING.—The gun is sighted centrally with a tangent scale or hind sight, and a dispart or foresight,

The tangent scale consists of a rectangular steel bar, with a cross-head also of steel, the bar is graduated in degrees, each degree being subdivided into twenty divisions, a division being equal to three minutes of elevation. The cross head is grooved on the top, and is fitted with a gun metal leaf which can be moved either to the right or to the left, to compensate for accidental deflection, caused by wind, one wheel being higher than the other, etc., the front of the cross-head is bevelled, and graduated right and left of the centre, in divisions reading three minutes each. The leaf is moved or clamped by means of a thumb screw working in a slot in the back of the cross-head. The tangent scale works in a gun metal socket inserted in the breech of the gun, at an angle of 1 deg. 30 mins. to the left, that being the angle which compensates for the derivation* of the projectile, caused by the rifling. The cross-head is fixed on the bar with a corresponding dip to the right so as to be horizontal when the scale is in use. When the tangent scale is lowered to zero, its apex is flush with the upper surface of the gun, this protects it from injury when not in use; when raised it is kept in position by a gun metal thumb screw.

The dispart sight is a small steel "leaf," screwed into the gun near the muzzle. The metal of the gun at this part is made the same thickness as at the breech, so as to form a "dispart patch," and give a line parallel to the axis of the gun. This sight, also, is protected from injury in mounting, dismounting, etc., by being fixed in a recess.

TRUNNIONS.—The trunnions are 3.5 inches in length and diameter, and their axis coincident with that of the bore.

VENT.—A hardened copper cone vent is screwed in so as to strike the curve at the bottom of the bore, both to ensure that the whole of the unconsumed portion of the cartridge may be blown out, and also for the purpose of firing very reduced charges. The highest initial velocity would be given by striking the cartridge at a point four-tenths of its length from the base, but the strain on the gun would be proportionately greater.

* The deviation caused by rifling is called derivation, that caused by wind and other circumstances deflection.

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AMMUNITION

The various stores issued with the 9 Por. M. L. R. gun, embraced under the term Ammunition, consist of the following:—

Projectiles,	{ Shells, { Common.
	{ Shot, Case.
Cartridges,	{ Service flannel, 1½ lbs.
	{ Exercising Silk, 1 lb.
Fuzes,	{ Percussion, Royal Laboratory.
	{ Time, { 9 seconds M. L. O.
	{ 5 " "
Tubes, friction, copper,	" "
Primers,	{ Brass, for Shrapnel shell.
	{ Gun cotton.
Gunpowder.	
Portfires.	
Quick-match.	
Slow-match.	
Fuze-hole plugs.	
Wads, papier machie.	

COMMON SHELL. Designation—Shell, Rifled, Muzzle loading, Common, 9 Por.

DESCRIPTION.—Is of cast-iron, having a cylindrical body and ogival* head, or point, the curve of the head being struck with a radius of 7·5 inches; the shell is cast hollow, and is lacquered internally with red lacquer to prevent premature explosion of bursting charge, by friction of rotation; it is provided with a conical opening in the point called the fuze-hole, through which the bursting charge, (8 ounces Shell L. G. powder), is inserted, this hole is tapped to the General service† gauge for the reception of the Royal Laboratory percussion fuze, or a gun metal screw plug, (fuze-hole plug). The exterior of the shell is provided with three rows of zinc studs, two in a row, they are secured to the shell by expansion—countersunk holes being cut in the shell and the studs expanded by compression—the studs in each row, are placed in the shell 3·6 inches apart, and at the angle due to the rifling, i.e., 1 turn in 30 calibres.

When issued filled the fuze-hole is secured by a papier machie

* Ogive a pointed arch.

† Shells for Sea service had formerly, larger fuze-holes than those for Land service, but they are now assimilated, and the gauge common to both services is called the General service gauge.

wad which is driven into it, the fuze-hole plug being screwed in over the wad.

PAINTED.—Black except studs.

FUZES USED.—Percussion: Royal Laboratory. Time: 9 seconds M. L. O., or 5 seconds M. L. O., if specially required. The time fuze, however, is not generally useful with Common shell, it is more particularly applicable to Shrapnel.

USE.—With percussion fuzes, Common shell is most effective against troops holding ordinary buildings, log houses, stockades, etc., bursting just after penetration,* scattering fragments and debris among the defenders, and finally setting fire to the building; such fire quickly causes the withdrawal of troops. They can also be used with percussion fuzes against troops in mass, or sheltered in woods, when the shell fragments are more effective than Shrapnel balls, which are stopped by the branches. They are especially destructive when fired from a height at troops on comparatively hard ground, as was the case from the hills round Sedan on the paved streets below. Their exceptional use with time fuzes, is for curved fire at troops behind earthworks, or rolling curves of ground, the shell being burst just over the crest, but this is delicate work, requiring that Artillery skill, produced by considerable practice, combined with perfect materiel.

SHRAPNEL SHELL. Designation.—Shell, Rifled, M. L., Shrapnel-Boxer, 9 Por.

DESCRIPTION.—The body is a hollow cast-iron cylinder, open at the top, but having a solid bottom, it is provided externally with studs the same as the Common shell; internally it is divided into two parts, the powder and bullet chambers.

The powder chamber which is at the bottom of the shell, is smaller in diameter than the bullet chamber, and is formed by casting the wall of the shell at the bottom, thicker than the upper part, so as to form a cup, into which fits a tin cup for the reception of the bursting charge, (12 drs. service pistol powder), the tin cup is to prevent the accidental explosion of the shell on the shock of discharge, (which might be caused by pieces of metal being knocked off the shoulder of the powder chamber), over the tin cup and resting on the shoulder before mentioned, is a wrought iron disc, or "diaphragm," having a small hole in its centre, tapped to receive a brass pipe, which is screwed into it, and which forms the channel of communication between the fuze and the bursting charge; this pipe is also tapped internally at the top to receive a primer, which flashes the flame from the fuze to the powder chamber, the top of the pipe is enlarged so as to fit the inside of a tin socket which is soldered to it, and forms

* The time fuze, if bored long, will generally act on impact, being driven into the shell or split by coming in contact with ordinary masonry or logs, the newly turned earth of a parapet does not offer sufficient resistance.

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a cup for the bottom of the fuze, the top of the tin socket is flush with the top of the body.

The bullet chamber up to mark* IV, inclusive, is weakened by 6 longitudinal grooves in the wall of the shell, called "lines of least resistance," (mark V is not weakened), it is lined with brown paper,† and filled to within a short distance 1 cm the top, with bullets made of lead and antimony, the interstices between them being filled with melted rosin, the bullets are covered with a kamptulicon ring, well kitted to prevent the rosin escaping into the interior of the shell.

The head of the shell is a thin skin of Bessemer iron, ogival in form, having a gun metal socket, or bouche, in the point, for the fuze-hole, (in patterns up to mark III, inclusive, the nose of the socket projected beyond the head unsupported, but in subsequent patterns it is stronger, and the part projecting beyond the iron forms a continuous curve with the head), which is soldered to the tin socket, the empty space in the head, between the iron skin and socket, is filled with wood, and the head is secured to the body, in the earlier patterns by plain rivets and solder, but in the later patterns screw rivets are substituted for plain rivets.

PAINTER.—Body black except studs, head red except socket.

FUZES USED.—Royal Laboratory percussion; 5 seconds M. L. O. time, and 9 seconds M. L. O. time for long ranges. The time fuzes are most properly used with Shrapnel, liberating the bullets before the impact of the shell.

USE.—With time or percussion fuzes against troops in line or column. They may be used with time fuzes against artillery, if it be desired to kill the gunners, drivers and horses when partially sheltered by a rising ground; or with percussion fuzes if the intention be to disable the gun by smashing the carriages. They can also be used with percussion fuzes against troops in wooden buildings, or against guns in embrasures,‡ by filling the shell with powder close up to the fuze.

* The mark or numeral, is found on the side of the shell, near the base, thus, R. A. L. and the date of manufacture on one of the studs.

† To prevent the rosin which keeps the bullets compact, adhering too firmly to the metal of the shell.

‡ It may be thought improbable that field guns would be brought into action against guns of a heavier nature behind embrasures, but in the last Chinese war, the British Armstrong R. L. field guns, in the field for the first time, silenced the heavier Chinese ordnance of the forts by their segment shell with percussion fuzes glancing against the sides of the embrasures or striking the guns scattering their fragments right and left among the gun detachments, the small bursting charge being supplemented by the centrifugal force due to the rotation of the shell. At Sedan the surrender of a fortress and an army, was in a great measure, due to the splendid positions taken up by the Prussian field artillery on the slopes of the surrounding hills, beyond the range of the old smooth bore armament of the fortress. Frequently in the late war on this continent, both sides entrenched

CASE SHOT. Designation—Shot, rifled, M. L., Case, 9 por.

DESCRIPTION.—The body, or outer case, until recently was made of XX single tin, (it is now made of tinned iron), the sides being in three parts, soldered together longitudinally.

The base is strengthened by having a solid disc of zinc, No. 12 W. G., laid in loose in the interior, and a ring of the same thickness riveted to the tin case on the outside.

The sides of the tin case are strengthened by being lined with three longitudinal segments of zinc, No. 14 W. G., laid in loose, and forming an internal cylinder.

The top consists of a zinc disc, No. 18 W. G., fitted to the case by turning over the fringed edge of the latter, to which it is soldered.

The case contains about 110 bullets of an alloy of 3 lead to 1 anti-mony, the interstices being filled in with a mixture of equal parts of sand and clay, tightly rammed.

Above the bullets a wooden disc is inserted; in mark II, which was provided with an iron handle for lifting the shot, this made its full length the same as the other projectiles for the gun, but the handle being liable to be knocked off, permitting the sand and clay to escape, is removed in mark III, which is therefore, about half an inch shorter.

PAINTED.—Black.

USE.—Against troops, or parties in boats. Its extreme useful range is about 350 yards.

SERVICE CARTRIDGE. Designation.—Cartridge, flannel, service, M. L., 9 Por., 1lb, 12ozes.

DESCRIPTION.—Is made of the best serge, all wool, in two pieces, the bottom being cut circular and the body rectangular; the body is formed by overlapping the edges one inch, and sewing them with three rows of stitches, the bottom is joined to the body by overlapping the edges three quarters of an inch and sewing them with two rows of stitches—fine worsted being used for sewing, the cartridge is then in the shape of a cylindrical bag. It is filled with 12lbs. of Rifle L. G. powder, and “choked,” this is done by gathering the mouth into plaits, and passing a needle threaded with three strands of coarse worsted through them, three turns are then taken round the neck thus formed, and the turns are prevented from slipping upwards by loops formed by stitching above and below them at intervals.

The cartridge is supported, or kept in shape, by bands of blue worsted braid, called “hoops,” passed horizontally round it, they are kept in position by being passed in and out through the flannel bag at intervals, and after drawing them tight tying the ends—one end of the band being provided with a loop the knot is made by passing the plain end through the loop and making it fast with a half hitch.

their guns; to bring these fiercely contested struggles to an issue, it was necessary for one side to move out and attack the guns of the other while in position.

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AMMUNITION.

PART. I. SEC. I.

MARKING.—They are marked on the outside in black, with the numeral or mark of the pattern, the nature and weight, thus:—

I.
9 Por. R. M. L.
1½ lb. 12ozes.

Should Rifle large grain powder not be available, Large grain powder may be used for these cartridges, but all cartridges so filled must be stamped with the letters L. G., in red, one inch long. N.B. The range is reduced by the use of L. G.

EXERCISING or SALUTING CARTRIDGE. Designation—Cartridge, silk cloth, R. M. L., 9 Por. 1 lb.

This cartridge differs from the service cartridge in being made of silk, being sewn, choked, and hooped, with silk twist, and in containing only 1 lb. of blank or exercising powder. It is marked similar to the service cartridge.

Silk being more readily consumed than flannel, is used for these cartridges on account of the small charge used, and from the fact, that the cartridge is not as thoroughly consumed when there is no resistance offered to the escape of the heated gas, by the absence of a projectile.

ROYAL LABORATORY PERCUSSION FUZE. Designation.—Fuze, percussion, R. L., screw.

There are two patterns of this fuze in the service, marks I. and II., but as mark I. is to be used with field guns until the present supply is exhausted, it will be necessary to describe it, and afterwards give the points of difference between it and mark II.

DESCRIPTION.—Mark I. consists of three principal parts—body, pellet, and guard.

The Body is cast with a solid head, and has a screwed in bottom, primed with a perforated pellet of meal powder, and closed by a brass washer. It has a thread outside to fit the G. S. fuze-hole, and a square hole in the top for the G. S. key, by which it is screwed in. A steel point projects downwards from the top. To avoid liability of accident in transport, a safety pin passes through the body and guard, and is secured by a brass ring resting in a recess round the head; the ring has a tape lug, by which it can be raised when it is necessary to withdraw the pin after the shell has been placed in the muzzle of the gun. The hole left by the removal of the pin is closed to prevent premature explosion, from the flame of the discharge, by a lead pellet working in a cylindrical hole above; the inertia of the pellet causes it to cover the hole either in ramming home or firing the shell.

The Pellet of white metal (equal parts of lead and tin), has four projections or feathers outside, two rather higher than the others. It is driven with composition like a tube, but has a percussion cap at the top, the composition in which is protected by a thin brass disc which can be pierced if driven on to the steel point above by a violent shock;

the cap has three holes at the bottom for the passage of the flame from it to the composition below.

The Guard, made of gun-metal, is supported in the upper part of the body on the feathers of the pellet, preventing any forward movement of the latter.

ACTION.—When the gun is fired the inertia of the guard sheers the feathers of the pellet, the guard then resting on the bottom of the fuze with its upper surface in a line with the top of the pellet. On the impact of the shell against an object, the pellet continues its forward motion, when the top of the fuze is suddenly stopped, the cap striking on the steel point is fired, the flame ignites the mealed powder in the pellet, and blowing out the washer of the fire-hole in the bottom of the fuze passes into and explodes the shell.

Mark II. differs from mark I. in the following particulars:—

1st. The pellet and guard are smaller in diameter, to admit of greater thickness in the side of the fuze, and of a deeper screw thread at the bottom, thereby giving the base greater power to support the weight of the pellet and guard on the shock of discharge.

2nd. The pellet has no mealed powder pressed into it, and there is an increased quantity of detonating composition in the cap at the top of the pellet. The fuze is thus made quicker and more certain in its action.

3rd. The safety pin (of double twisted wire), passes through the head of the fuze, and is kept in its place by the two ends being opened out slightly so as to bind themselves in a conical cup. A thin disc of brass is then fitted in over the ends, and soldered over to keep the fuze watertight. The head of the safety pin is fitted with a loop of string, by which it is withdrawn. There is no brass ring or recess round the head of the fuze.

9 SECONDS FUZE. Designation.—Fuze, time, wood, Boxer, M. L., 9 seconds.

DESCRIPTION.—Consists of a beech wood frustrum of a cone, about 8½ inches in length, having a composition bore, which is bored eccentrically from the top (or thickest part of the cone), to within a short distance of the bottom of the fuze, this bore is lined with a paper cylinder and driven with 1½ inches of fuze composition, which consists of:—

		lbs.	ozes.
Potretre, ground,	-	3	4
Sulphur, sublimed,	-	1	0
Powder, pit-mealed,	-	2	12

and above the fuze composition with ¼ inch of mealed powder.

Fuze composition burns when at rest at the rate of one inch in 5 seconds, and mealed powder at the rate of one inch in 2½ seconds, or half the time of a corresponding length of fuze composition.

The composition bore is closed by means of a gun-metal plug which is screwed into the head of the fuze, from the centre of this plug a copper pin projects downwards, to which the bites of two pieces of

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quick-match are secured, and the ends brought out through two holes and laid in a groove in the head of the fuze, the quick match is protected by a band of tape secured to the head of the fuze by india-rubber cement; this band is not to be removed until the shell is placed in the gun.

The paper lining in the composition bore prevents any space forming between the composition and the side of the fuze,* which might occur if the wood and composition were in contact, the wood being liable to shrink from change of temperature.

The gun-metal plug in the head of the fuze prevents the great pressure of the air to which the point of the shell is subjected (travelling point first), affecting the burning of the fuze, whilst the holes in the head, through which the quick-match is led, serve after the ignition of the fuze as escape holes for the gas generated by the burning composition, which, if not permitted to escape, would probably burst the fuze.

On the side of the fuze on which the wood is thickest, two small channels, called "powder channels," are bored up from the bottom to within a short distance of the top, about half way between the composition bore and the side of the fuze, and filled with "pistol" powder; breaking into and projecting beyond these channels are two rows of "side holes," ten in a row, drilled horizontally from the outside of the fuze, at a distance of 2 inch apart, (from centre to centre, measured vertically), the holes in one row not being opposite to those in the other, but dividing the space, the rows thus indicating, respectively, the odd and even tenths of an inch from the zero point of the fuze, the holes, like the channels, are also filled with pistol powder, with the exception of the bottom hole in each row, which is bored completely through into the composition, (to insure the ultimate action of the fuze should it have been improperly prepared), and filled with quick-match which supports the powder in the channels; the powder channels below the side holes, and a groove connecting the channels at the bottom, are also filled with quick-match—the object of the groove is to cause the powder in both channels to explode at once, thereby causing a stronger flash—and the side holes and bottom of the fuze are covered with varnished paper. The first side hole is marked two, and is immediately at the top of the fuze composition, the 4 inch of mealed powder above the top side hole being in lieu of 2 inch of fuze composition, the time of burning being the same it gives a greater substance to resist the action of the boxer when preparing the fuze to act at a short range, it not being so liable to crack or break away.

OBJECT OF THE POWDER CHANNELS.—The powder channels are necessary when the fuze is used with the Shrapnel shell, to carry the flash downwards, the bursting charge being at the bottom of the shell. They are also required with the Common shell when used at

* A space forming between the composition and the wood of the fuze, would cause premature explosion of the shell, and probable injury to the bore of the gun.

short ranges, the side hole being liable to be closed by coming in contact with the metal of the shell in the fuze-hole.

TO PREPARE THE FUZE.—Insert the bit of the borer in the side-hole corresponding to the required time of flight, (a tenth of fuze being equal to half a second of time, approximately), and bore it until the shoulder of the borer comes in contact with the side of the fuze, with the borer and fix the fuze in the fuze-hole, by screwing it tightly with the hand; when the shell is placed in the gun the fuze strip is to be torn off the head of the fuze, and the priming (see Primers gun-cotton), additional priming must be lapped round the head of the fuze,

ACTION.—On the discharge of the gun, the quick-match round the head of the fuze is ignited by the flame from the charge, this passing into the interior of the fuze ignites the composition, which burns uniformly down until it arrives opposite the bored side-hole, when the flame passes out into the powder channels igniting the powder in them, which explodes instantaneously, the flame from which passing into the shell ignites the bursting charge.

This fuze is designated by the time it burns when in motion, whereas all other time fuzes are designated by the time they burn when at rest.

APPROXIMATE RULE for finding length of fuze in tenths:—
For Common or Shrapnel shell.—Divide hundreds of yards in range by 2, and add—

Up to 1000,	1.
1000 to 2000,	2.
2000 to 3000,	3.

PAINT D.—It is painted black round the head and over one row of side-holes, and drab over the other row, the position and tenths of fuze being marked and numbered.

ISSUED.—Five in a tin cylinder, the junction of lid and cylinder being secured by a tin strip soldered over it, there is a label on the top of the cylinder indicating the nature and number of fuzes packed in it.

5 SECONDS FUZE. Designation.—Fuze, time, wood, Boxer, M. L., 5 seconds.

This fuze resembles the 9 seconds fuze, with the following exceptions:—

1st. It is driven with 2 inches of mealed powder instead of 1·8 inches of fuze composition and ¼ inch of mealed powder, it, therefore, only burns 5 seconds when at rest.

2nd. The side holes are marked in tenths and half tenths, instead of tenths only, and the top side hole reads 1 instead of 2.

3rd. The parts painted black on the 9 seconds are painted red* on this fuze.

* Fuzes driven with mealed powder are painted red, as also in this case, the head of the projectile with which it has to be used, viz., Shrapnel.

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The top of the cylinder in which they are packed is also painted red.

APPROXIMATE RULE for finding length of fuze in tenths:—

Divide hundreds of yards in range by 2, and if over 1000 add 1.

COPPER FRICTION TUBE. Designation.—Tubes copper, friction, service.

DESCRIPTION.—The copper friction tube consists of three pieces,—the barrel, nib-piece, and friction bar.

The Barrel consists of a narrow strip of copper formed into a hollow cylinder, open at both ends, (its diameter being $\cdot 2$ of an inch), and having a small hole cut in the side near the top; it is driven from the bottom with mealed powder damped with spirits of wine, after driving there is a small hole pierced up the centre of the composition with a fine wire, it is upon this hole that the peculiar action of the tube depends, as without it the mealed powder would burn like a squib, and fail to ignite the cartridge instantaneously.

The Nib-piece consists of a small piece of copper also formed into a cylinder, and secured by fine wire and solder to the barrel over the hole cut in the side.

The Friction bar is a very narrow strip of copper roughened on both sides, and formed into an eye at one end, the other end is inserted in the nib-piece, detonating* composition being placed above and below it, the nib piece pressed down on it with a pincers, and the eye turned slightly upwards; the top of the barrel is closed with shellac putty, and the bottom with a small disc of varnished paper to exclude moisture.

PAINTED.—Black.

ACTION.—When the friction bar is withdrawn by a steady pull, it ignites the detonating composition, this ignites the mealed powder in the barrel, and the heated gas thus generated rushes down the vent and ignites the cartridge.

PACKING.—They were formerly packed 100 in a zinc cylinder, having a band of shellaced calico pasted over the junction of lid and cylinder, they are now packed 25 in a tin cylinder, secured like those containing time fuzes.

There are other tubes which could be made in cases of emergency, but which are not considered service tubes, viz., the "Common Quill," and "Paper" or "Dutch."

COMMON QUILL TUBE.

DESCRIPTION.—It consists of a goose quill, about 3 inches long, the top being cut into 7 prongs, and a cup formed by woolding a strand

* Friction tubes or any stores containing detonating composition, must not be placed in a magazine under any pretence whatever.

of worsted above and below alternate prongs, the nib of the quill is then cut off, and the tube driven with a pin headed drift, the cup is primed with needed powder damped with spirits of wine, gum arabic, and distilled water, made into a paste, it is then covered with fine paper, and a fine wire passed up the tube.

PAPER OR DUTCH TUBE.

DESCRIPTION.—The barrel consists of a strip of fine white paper, about 2½ inches long, rolled into a cylinder of 2 inch diameter, and the edge secured by pasting; a cup is formed at the top of the barrel by a narrow strip of paper being rolled spirally upwards, the barrel is driven and pierced the same as the other tubes and the cup filled with priming paste, which is built up above the cup like a pyramid, a cup of fine paper steeped in a solution of saltpetre is placed over the top and tied with silk under the head, and the fine wire passed up through the tube,—there is an objection to these tubes, the paper being liable to peel in the vent.

Both this and the common quill tube have to be fired with a post-rifle or slow-match.

PRIMERS BRASS FOR SHRAPNEL SHELL.

DESCRIPTION.—It consists of a hollow cylinder of brass 1½ inches long, tapped externally for about half an inch from the top to screw into the brass pipe in the Shrapnel shell, in the top of the primer is a conical cup shaped recess perforated with small holes communicating with the interior of the primer, which is filled with loose powder, the bottom is closed by a thin annular disc covered with shalloon, the top of the primer is provided with two notches by means of which it is screwed into the shell—a screw driver being issued with the fuze implements for this purpose.

PACKED.—10 in a cylinder.

2 patterns have been issued, mark I. is now obsolete.

PRIMERS, GUN-COTTON.

About 20 feet of gun-cotton rope and 30 pieces of silk twist or thread, each 9 or 10 inches long, for use as additional priming for wood time fuzes, when firing with reduced charges, are issued packed in a tin cylinder, closed round the junction of lid and cylinder by a tape strip with the following instructions:—

"Unwrap the fuze as usual, open out the priming, and wind 10 or 12 inches of gun-cotton round it, bringing the ends of the priming together, leaving about two inches loose, then fix the whole firmly by tying over it a piece of silk."

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COMMON PORTFIRE. Designation.—Portfire, common.

DESCRIPTION.—The common portfire consists of a hollow rolled paper cylinder, about 16 inches long, and a little less than three-quarters of an inch in diameter, one end is closed by the paper being turned in, and the cylinder is driven with composition, consisting of

Saltpetre, ground	6 lbs.	0 ozs.
Sulphur, sublimed	2 "	0 "
Powder, mealed, cylinder	1 "	4 "

provided at the open end with priming paste, (mealed powder damped with methylated spirits), and a small hole is drilled into the composition to facilitate ignition.

PAINTED.—The case is painted a sort of flesh color.

It burns from 12 to 15 minutes.

PACKED.—12 in a bundle, tied with twine, and having a paper cap secured over the primed ends.

USE.—To fire guns, fougasses, mines, etc., they should not be used, however, to fire guns at night, as a blazing portfire lights up a whole gun detachment for an enemy to fire at.

BLUE, OR SLOW PORTFIRE.

DESCRIPTION.—It consists of a solid roll of blue "sugar-loaf," porous brown, or blotting paper, impregnated with a solution of 3 ozs. of saltpetre to 1 quart of distilled water, it burns from 2 to 3 hours. It takes its name from its color and rate of burning.

USE.—It may be used instead of slow-match or common portfire, for firing guns at night, when it is not desirable to show a light.

They are not generally issued for service, but might be easily made in cases of emergency.

QUICK-MATCH. Designation.—Match, quick.

DESCRIPTION.—Is made of cotton wick, in three sizes, 4, 6, and 10 threads, coated with

	4 threads.	6 threads.	10 threads.
Cotton wick	1 lb. 10 ozs.	2 lbs. 2 ozs.	2 lbs. 7 ozs.
Gum, Arabic	0 " 8 "	0 " 9 "	0 " 10 "
Powder, mealed, cylinder	20 " 0 "	20 " 0 "	21 " 0 "
Water, distilled	8 pts.	9 pts.	10 pts.

When not confined it burns at the rate of 1 yard in 13 seconds, when confined in a paper tube, called a quick-match "leader," it explodes instantaneously.

SLOW-MATCH. Designation.—Match, slow.

DESCRIPTION.—Is made of Russian hemp, loosely twisted, or untwisted rope, boiled in wood ashes and water, in the following proportions:—

Hemp, yarn
Ashes, wood
Water

100 lbs.
1 bushel
50 gallons.

It burns at the rate of 1 yard in 8 hours.

USE.—To ignite the Common quill, or Paper tubes; in default of tubes, a piece of quick-match placed in the vent, or a little loose powder poured down it, and fired with slow match will answer.

FUZE-HOLE PLUG. Designation.—Plug, metal, fuze-hole, G. S.

DESCRIPTION.—The fuze-hole plug is a solid piece of gun-metal, conical in form, and tapped from top to bottom, it is provided with a square hole in the top to receive the general service key, by means of which it is screwed into the shell.

PAPIER MACHIE WADS. Designation.—Wads, papier machie, fuze-hole, general service.

DESCRIPTION.—Is a ring of papier machie, about 1 inch in diameter, (the hole in the centre being about half an inch in diameter,) having a disc of shalloon pasted on to one side. It is placed in the shell with the side on which the shalloon is cemented downwards.

Is very easily forced into the shell when the wooden time fuze is about to be used, and does not require to be removed when a metal percussion fuze is to be used.

They are to be placed in the fuze-holes of all shells that are carried filled and plugged, to prevent grains of powder working up from the jolting of the limber into the fuze-hole threads, which might cause explosion* in screwing in the fuze.

* Loose powder escaping about the limber boxes, has been considered the cause of explosions of limbers when galloping into action over rough ground. Those who have witnessed such a calamity are impressed with a caution that appears unnecessary to the inexperienced.

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GUNPOWDER.

Gunpowder is an explosive propellant agent, consisting of an intimate mixture of saltpetre, sulphur, and charcoal, the proportion of the ingredients, as manufactured for the British service is as follows:

Saltpetre,	75 parts.
Sulphur,	10 "
Charcoal,	15 "

The action of gunpowder is due to the oxidation of the charcoal by the oxygen of the saltpetre, (1 cubic inch of saltpetre contains as much oxygen as 3000 cubic inches of air), which generates a large volume of heated gas of great expansibility, this action in a mixture of saltpetre and charcoal alone, is comparatively slow, sulphur is, therefore, added to render it more rapid, which it effects on account of its igniting at a much lower temperature than either of the other two; the gradual conversion of gunpowder into gas is of great advantage when it is used as a charge for guns, the strain on the gun being gradual in consequence—this development, or conversion, and consequent strain, can be moderated in four ways:—

1st. The size of the grain.

2nd. The shape of the grain.

3rd. Its density, and

4th. The amount of glazing imparted to it.

1st. When the charge is ignited, each grain in succession, becomes ignited over its whole surface, and burns in concentric layers, it is evident, therefore, that a large grain will take longer to burn than the same size of grain broken into several pieces, just as a large lump of coal will burn longer solid than it will when broken up, less surface being exposed to ignition; this, however, can be modified or increased by the

2nd. For if the shape of the grains be irregular, the larger will be the interstices between them, and, consequently, a greater facility will be given to the heated gas for the ignition of the whole charge; whereas, if the grains are flat or angular, fitting compactly, as it were, the interstices will be fewer, the passage for the gas smaller, and the velocity of ignition reduced.

3rd. The degree of density is, manifestly, a measure of the rate of burning.

4th. The degree of glazing imparted to the grains, will also affect the rate of ignition, the more highly glazed powder being slower in its action. Glazing also serves other purposes, it causes the powder to meal less in travelling, and renders it less liable to absorb moisture.

CLASSES.—The gunpowder in the service is classed under 3 heads, I. Service. II. Blank. III. Shell.

I. Service powder includes all powder fit for filling cartridges to be used with projectiles, either for guns or small arms.

II. Blank includes all powder, which being slightly deteriorated is only fit for salutes and exercise

III. Shell powder is more deteriorated than class II. and only fit for filling shells.

The various kinds used with the 9 por. M. L. R. gun, (compositions included), are the following:—

1. Service R. L. G. (Rifle large grain).
2. Blank R. L. G.
3. Service L. G. (Large Grain).
4. Blank L. G.
5. Shell L. G.
6. Service pistol.
7. F. G., or Fine Grain.
8. Mealed powder.
9. Mealed pit powder.

1. Service R. L. G. (passed through a sieve having from 4 to 8 meshes to the inch), is used for the service charge.

2. Blank R. L. G., is deteriorated Service R. L. G., it is used for the same purpose as No. 4.

3. Service L. G. (8 to 16 mesh), is used for smooth bore ordnance, but can be used for M. L. R. guns up to the 9 inch 12 tons, 7 por. excepted. N.B. It decreases the range for a given elevation.

4. Blank L. G. is Service L. G. deteriorated, it is used for salutes or exercising.

5. Shell L. G. is used for filling common shell.

6. Service pistol has a very small grain, (44 to 72 mesh), and is very rapid in its action: it is used for the bursting charge of Shrapnel shell.

7. Service F. G. (16 to 36 mesh), can be used in lieu of Service pistol for the bursting charge of Shrapnel shell.

8. Mealed pit powder derives its name from the fact that the charcoal used in its manufacture is burned in pits instead of in iron cylinders, it burns more rapidly, and is more regular in its action, than mealed powder: it is used for fuze composition.

9. Mealed powder is ordinary powder reduced to dust, this is performed in the factory by placing it in a revolving cylinder with gun-metal balls; on service it can be readily performed on a table free from grit or iron balls, with a wooden rubber: it is used for priming fuzes, etc., where great regularity of burning is not required.

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GUN.

MODE OF PACKING AMMUNITION and STORES belonging to the 9 Pn, M, L, R.
GUN CARRIAGE and LIMBER.

LIMBER.

NEAR BOX.
1 half-round grease tin box,
3 lbs., under,

1 pair drag ropes,
1 felling axe,
under footboard,
MID BOX,

OFF BOX,
1 swingletree,
1 bill hook, under,

6 shrapnel shells,		
3 common shells, 10 5-sec. wood time fuzes, under.	18 filled cartridges in canvas cartouch, 1 fuze pocket with gimlet borer,	3 common shells, 10 9-sec. wood time fuzes, under.
6 shrapnel shells,		

10 peren fuzes
16 peren fuzes
16 peren fuzes
2) 5-sec. wood time fuzes,
100 friction tubes,
2 lanyards.

6 shrapnel shells,		
3 common shells, 10 5-sec. wood time fuzes, under.	18 filled cartridges in canvas cartouch, 1 fuze pocket, with gimlet borer,	3 common shells, 10 9-sec. wood time fuzes, under.
6 shrapnel shells,		

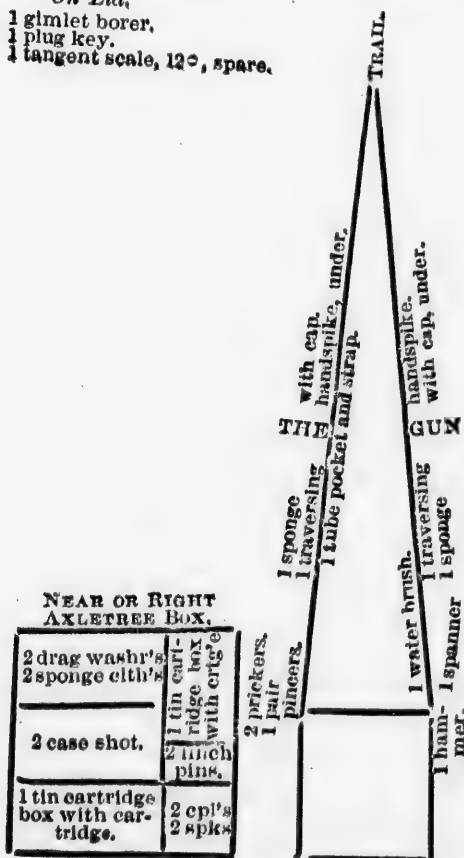
1 camp kettle, under,

1 pickaxe, under,

2 leather buckets, under,

On Lid,
1 gimlet borer,
1 plug key.
1 tangent scale, 12", spare.

On Lid,
1 fuze extractor,
1 gimlet borer,



NEAR OR RIGHT AXLE TREE BOX.	
2 drag wash'r's 2 sponge clth's	1 tin cart- ridge box with cr't's
2 case shot.	2 tin cart- ridge box with cr't's
1 tin cartridge box with car- tridge.	2 ep'l's spk's

OFF, OR LEFT AXLE TREE BOX.	
1 tin cart- ridge box with car- tridge	1 oil can,
1 box g'n et'n box with car- tridge.	2 case shot.
1 tin cartridge box with car- tridge.	

1 worm under,
Tampeon, with lanyard,
cwt's. qrs. lbs.
Weight, - 35 1 18

NOTE.—A little oakum or leather may be used with advantage to prevent the movement of the projectiles in the boxes.

AMMUNITION WAGON, MODE OF PACKING AMMUNITION and STORES.

LIMBER.

- 1 pair drag ropes.
- 1 picket rope.
- 1 lifting jack.
- 1 felling axe, under footboard.
- Mid Box.

- OFF Box,
- 1 swingletree,
- 1 bill hook, under.

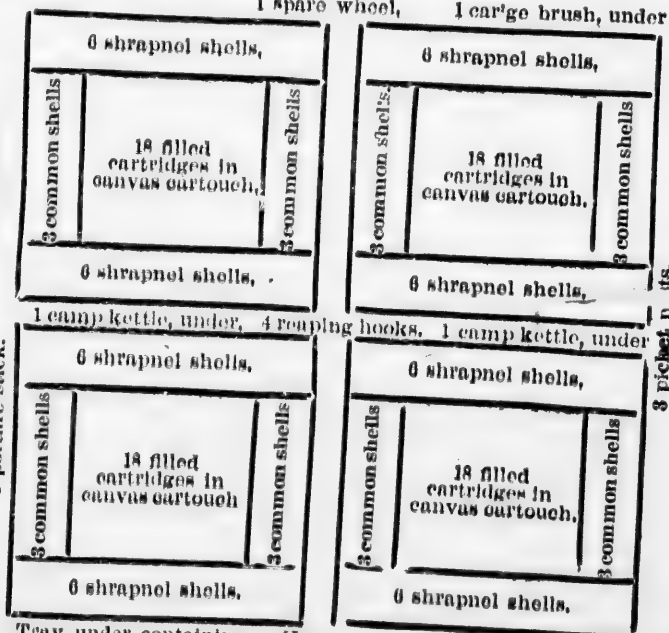
- NEAR BOX.
- 1 half-round grease tin box, 3 lbs., under.



WAGON BODY.

- FORE.
- 1 spare wheel,
- 1 carge brush, under footb'd

- 1 handsaw in case, and 3 picket posts.
- 1 portfire stick.



- Tray, under, containing—
- Hammock line.
- 2 sponge cloths.
- Tube pocket and strap.
- 23 lbs grease in tin magazine box, under.
- 1 maul, under.

- Tray, under, containing—
- Linch pin and washer.
- 1 lb. slow match.
- 2 sponge cloths.
- 1 dummy friction tube, for drill.
- 1 plug, metal, drill, with lanyard.
- Horse-shoe box, under, with drill cartridge.

- On Lid of Near Hind Box.
- 2 portfires.
- 1 holdall, with needles and worsted.
- Under Wagon.
- { No. 1, 1 near shaft.
- { No. 2, 1 off shaft.
- Weight, without tents; 40 cwt.

- On Lid of Off Hind Box.
- 2 portfires.
- 1 portfire clipper.
- 1 q. 0 lbs.

GUN.
MODE OF PACKING AMMUNITION and STORES belonging
GUN CARRIAGE and LIMBER,

NEAR BOX,
 1 half-round grease tin box,
 8 lbs., under,

6 shrapnel shells,	
s. ne	1 s. ne

LIMBER.

1 pair drag ropes,
 1 felling axe,
 under footboard,
MID BOX,

16 peren fuzes
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THE CARRIAGE.

The Carriage is composed of the gun-carriage and limber, the former supports the gun whilst the latter carries a portion of the ammunition necessary for the service of the gun, the two forming together, when "limbered up," a single carriage on 4 wheels, suitable for transport or manœuvring.

The gun carriage consists of the trail, axletree and bed, wheels, axletree boxes, and elevating screw.

TRAIL.—The trail properly speaking is the body of the carriage, it is formed of two angle iron frames, deeper in front than in rear, with plate iron rivetted to them on the outside, these frames or "brackets" are kept the proper distance apart in front for the gun to fit between them by a plate or transom of iron whilst the small ends are brought close together and secured by a plate of iron (trail plate) having an eye (trail eye) at its extremity for attachment to the limber, this eye is "tipped" with steel on the parts which rub against the hook on which it is keyed when attached to the limber; they are further secured by a centre transom and two through bolts. On the upper surface of the brackets, near the front, are two semicircular depressions called "trunnion holes," for the reception of the trunnions of the gun, the axis of the holes being at right angles to the axis of the carriage, the trunnions are prevented from jumping out of the holes, when the carriage is travelling over rough ground, by means of two plates of iron, called "capsquares," which fit over them and are secured to the brackets by keys. Two iron handles for lifting are rivetted one on each side of the trail (trail handles) at the small end; on the upper surface of the trail, between the handles, there is a ring and shoe for the handsprake used in pointing the gun.

AXLETREE.—Is of wrought iron, and consists of the body and arms, the body is square in section and is fixed in a wooden bed attached to the brackets by two bands of iron, each band being secured by 4 screw bolts, the axletree is further secured by a screw bolt passing through the front transom; the axletree arms, conical in form, and turned to fit a 10 inch "pipe box," are in direct prolongation of the body of the axletree, but have two inclinations, one slightly downwards, $\frac{1}{4}$ inch, termed the "hollow of the arm," which is given in order to compensate for the "dish" of the wheel, by bringing each spoke in turn, as it comes to the ground, nearly vertical; the other slightly forward, .062 inch, termed the "lead of the arm," which keeps the wheel true on the conical arm, these two inclinations form what is called the "set of the arm." There is an iron plate under the axletree bed, at each end, to prevent the lifting jack cutting the wood when the wheels are being removed for any purpose.

WHEELS.—The wheels are those known as the Madras pattern.

A wheel consists of the nave, the spokes, and the fellows: the nave is the centre of the wheel, it is made of gunmetal in three pieces,

viz., 2 flanges, and a pipe box, the pipe box fits over the axletree arm, and revolves round it when the carriage is in motion, the flanges fit over the pipebox and keep the spokes, which are made of oak, in position round the pipebox, i.e., as radii of the circle of which the axle is the centre, the flanges are secured by nutted bolts, one bolt between each spoke, the pipe box is prevented revolving in the flange; the spokes have a slight inclination outwards, about half an inch to the foot, this is called the "dish of the wheel," it is given in order to enable them to withstand the external thrust to which they are subjected in passing over rough ground, when one wheel is frequently higher than the other: the greater distance between the wheels above, also leaves more room for the load, and gives greater facility of approach to the parts near the axletree. The felloes are made of ash. The wheel is shod with a ring tire $2\frac{1}{2}$ inches broad. A field service wheel is 5 feet high.

AXLETREE BOXES.—Are rectangular in form, made of wood, strengthened with copper round the edge of the lid and hoop iron at the corners, they are secured to the top of the axletree bed, one on each side, between the brackets and wheels, by rib-plates and stays of iron; in addition to carrying a few rounds of ammunition, etc., they serve as seats for two of the gun detachment, an iron guard, the upper part of which is covered with leather, is secured to the outside of the box, and protects the man from the wheel, whilst a leather strap secured at one end to the guard and at the other end to an iron bolt attached to the inner corner of the box acts as a support to his back, there is also an iron rest for the feet which when in use slides into staples in the side of the box, and is secured by a turnbuckle.

ELEVATING SCREW.—Designed by Sir J. Whitworth, it consists of a wrought iron screw working in a metal nut enclosed in an iron box which oscillates from front to rear between the brackets, the nut is turned by a pinion connected by a shaft with a small hand wheel outside the bracket. A brass plate attached to the top of the right bracket gives the ranges, elevations, and length of fuze for the gun. In addition to several staples at different parts of the carriage, there is a loop on the upper surface of the right bracket near the small end for the sponge when not in action.

LIMBER.—The limber consists of a framework, formed by 2 transverse and 3 longitudinal pieces of iron, an axletree, axletree bed and board, foot board and 2 shafts.

The front transverse piece is called the "splinter bar," and is connected by the longitudinal pieces, called "futchells," to the rear transverse piece, which is simply a piece of angle iron by means of which the whole framework is secured to the axletree bed; the extremities of the splinter bar projecting beyond the futchells are strengthened by iron stays attached to the axletree bed, it is provided underneath with 3 bands or shaft irons, and one V shaped iron to receive the shafts. The platform board is about 9 inches broad, it lies across the futchells in front of the axletree bed, and is provided with 3 box staples in rear to which the ammunition boxes

is over the axletree arm, in motion, the flanges which are made of oak, in the circle of which the y nutted bolts, one bolt and revolving in the o a slot cut on the inner outwards, about half an wheel," it is given in al thrust to which they when one wheel is fre- distance between the load, and gives greater etree. The felloes are re 2½ inches broad. A

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are fastened. The ammunition boxes are of wood, 3 in number, 2 large ones about 21 inches square, for carrying projectiles and cartridges, and a narrow one between them to hold fuzes, the edges of the lids are bound with copper and the bodies are strengthened with corner pieces of iron, the two large boxes act as seats and to protect the men from the wheels are fitted on the outside with folding guard irons which double completely back for stowage in transport, when in use they are kept erect by small keys, the front of the boxes rest on the axletree bed, and the rear on 4 iron brackets; they are secured on the top of the limber, in front, by iron nib plates which fit in the box staples already mentioned, and in rear by broad leather straps which after being passed through handles in the rear of the boxes and staples on the axletree bed are buckled on the outside, the footboard lies across the futchells in front of the platform board.

The limber hook, to which the trail of the gun carriage is attached when limbered up, is secured to the rear of the axletree bed by 3 bolts it is made of wrought iron, with steel bearings on the inside where the trail eye rests, to prevent it wearing away, the trail eye is prevented jumping off the hook when passing over rough ground by a bolt or key which is passed through a hole in the hook.

The fact of being able to unlimber the gun carriage has the following advantages:—

1st. The limber and horses can be removed from the recoil, dangerous proximity to the gun, and placed behind any cover which may be offered, as houses, irregularities of ground, &c.,

2nd. The gun resting only upon 3 points, viz, 2 wheels and the point of the trail, admits of the piece being more readily laid and gives more room to the numbers working it.

3rd. When limbered up the trail takes a proportion of the weight of the limber off the horses backs, and the free attachment gives ample scope for manœuvring, diminishing the chances of upset from uneven ground, the absence of rigid connection allowing limber and gun axes to take various inclinations independently.

SHAFTS.—Are of ash, "near" and "off," the latter is the Brangling pattern, which consists in having the part between the splinter bar and the axletree arm entirely of iron, it consequently can be made much thinner than if of wood, thus allowing more space for the mud to work through when the carriage is moving over heavy ground.

For single draught the near shaft passes through the near splinter bar band, and fits into a stirrup iron which is suspended vertically underneath the left futchell. It is secured by an iron bolt which passes through the footboard, left futchell, and shaft, and is keyed underneath. The off shaft passes through the V-shaped iron, and fits on the iron crutch in front of the axletree bed, which during double draught carries an iron washer, this washer being shifted to the axletree arm, when the shafts are fitted for single draught.

For double draught the near shaft passes through the centre splinter bar band, the end fitting in to a mortice in front of the axletree bed, and is secured by an iron bolt which passes through the platform board, centre futchell, and shaft, and is keyed underneath.

The off shaft passes through the off splinter bar band, and the wheel iron at its extremity lies on the end of the axletree arm, netting at the same time as a washer.

Trouble draught may be arranged by fixing the shafts as for single draught, and using swing trees, which are fastened to the trace loops at the extremities of the splinter bar.

9 PR. M. L. R. AMMUNITION WAGON.

No 9 Pr. M. L. R. Ammunition Wagons have as yet been provided for the Militia of Canada. It is not, therefore, thought necessary to describe them in detail. The general principles of construction of the wagon body and limber, are similar to the old wooden pattern, wrought iron being used in the wagon, as in the new wrought iron limber, also wheels with gun metal naves. The details of packing the ammunition are given on next page.

SLEIGH CARRIAGES.

A gun with its ammunition can be arranged on sleighs. The sleigh consists of a platform, placed on runners 16 inches high, the breadth of the runners being 3 feet. The summer carriages can be conveyed on the sleighs in case of emergency.

Three sleighs form one subdivision.

On No. 1, is mounted the gun (muzzle to the front), with its side-arms, and a box on each side of the gun to hold ammunition, and which serve as seats.

No. 1 Ammunition Sleigh, carries the front box of wagon body, and the gun limber boxes. No. 2, the rear box of the wagon body, and the wagon limber boxes. The knapsacks are carried on the Ammunition Sleighs. Two horses are sufficient for each sleigh.

On the march, when the snow is deep and roads narrow, the spare horses should be in front, or distributed between the subdivisions they are to assist.

In descending a hill, drive straight down however steep. When a sleigh slews round, the horses should be thrown off to the side to which the sleigh inclines to slew; if not thus checked, horses must be pulled up.

Single Draught.—When this becomes necessary, the off horse remains in shafts, which are shifted to centre of sleigh; long reins are backed on, and horses driven from sleigh; near horses have each a pair of leading traces hooked on, and are hooked on in front of shaft horses; drivers remain mounted. If a third horse is required, he is placed between the others, the leading rein being attached to crupper ring of leading horse.

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RULES FOR ARTILLERY COMPETITIVE PRACTICE, CLASSIFICATION of GUNNERS and DRIVERS, AND SELECTION OF MARKSMEN.

Improvements in Artillery material are thought by many to be worse than useless, unless accompanied by a corresponding increase of intelligence and training amongst Officers, N. C. Officers, and gunners. Imparting and encouraging this professional knowledge among the rank and file, or applying it, where it exists, by selecting the best qualified Non-commissioned Officers, or men for pointing our guns in action, is one of the most important duties of an Artillery Officer. Our expensive modern projectiles will be worse than wasted in war, as they are in peace, if fired away by men who may be short sighted, unable to adjust a tangent scale, or incapable of setting a fuze to a given range.

Those who have passed years in daily instruction of the rank and file of Artillery are painfully impressed with the habitual neglect of this point, notwithstanding its importance, about which they cannot be mistaken.

Unpalatable as such expressions may be, there is nothing gained dishonestly shirking conclusions that may be drawn from the results of the late campaigns, and deliberate trials in peace time. Marvelously few hits are made when the circumstances approach the probabilities of actual war, viz.—Unknown range, uneven ground, and rapid fire, add to these the element of nervousness and confusion, and you would have still less satisfactory results, and an expenditure of ammunition out of all proportion to the effect produced. A system of picked marksmen and range finders when combined with mobility given by gun-axle seats, and men on the off horses, will retain for Field Artillery its destructive superiority over the other arms.

In the ranks are mingled some who cannot read the figures on a fuze or tangent scale; and others of excellent education, great natural powers, and quickness of sight. It must be a waste of money and time, to have no system of selection for marksmen and range finders, and to apply the same dull routine of training to all.

We all know that Non-commissioned Officers are selected for many excellent qualities, with which gunnery proficiency has some-

times little to do, when therefore, the Sergeant in command of a field gun is not a marksman he need not relinquish the command of his sub-division but the marksman will take the place of No. 4, and lay the gun while No. 1 takes his place at the hand-spike, other duties remaining the same.

The battery being the Artillery unit, and various batteries being armed differently, the competition must be confined to the battery; a comparison between batteries can only be made, where they use a similar armament and other conditions are equal.

SELECTION.

The most intelligent men and best drills are first chosen. Then the best shots with small arms as likely to be the best natural gunners, a further selection is then made by the inexpensive plan of trials, by pointing guns at objects against time, but without ammunition, by lastly by actual firing at a target. These selected men will be termed "marksmen," and every gun in peace or war, except for special instruction, should be laid by one of them: there being sufficient in each battery to make up casualties.

Competition may be divided into four heads, A, B, C, and D.
1st. (A.) Preliminary instruction in the Camp or Barrack-room, by Subaltern Officers in command of divisions, to consist of conversational lectures from the Manual on Elementary Gunnery, each lecture to be followed by viva voce questions and answers by which a selection of all those who have a sufficiently intelligent knowledge of the subject can be made.

2nd. (B.) Standing gun drill; Setting fuzes; Use of Ammunition and stores in charge of the Battery; Pointing drill to eliminate men of defective sight and those who may be too slow in laying or drilling. The use of the range-finder for Officers and a few selected Non-commissioned Officers, as judging distance drill is of little practical value beyond 1200 yds. which is ordinary Artillery range.

3rd. (C.) Carbine or small arm practice which may be done previously or when opportunity offers, provided a reliable record is kept with a view of selecting the best shots as likely to be the best natural gunners.

4th. (D.) Actual gun practice by the selected Non-commissioned Officers and men after the three previous tests. In action Officers are generally intent upon watching the enemy and the effect of fire, they cannot usually be spared to lay a single gun, but in the Militia where they can have but little practice, they may compete when the commanding officer thinks fit. He can also take the preliminary instruction and selection (I. A.) into his own hands, but Subaltern Officers with gunnery certificates should be quite competent.

For Garrison Artillery, in addition to the above, the instruction must be wider, embracing shifting ordnance, knotting and splicing, the general duties, Manual of Artillery Exercises. Models are a great assistance. The Garrison Artilleryman should be familiar with the ranges of conspicuous objects surrounding the fortress, and

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buoys marking a ship-channel in coast defences. He should have a perfect knowledge of that portion of the defences, and its arma- ment, in charge of the battery to which he belongs.

The final selection of first-class men, for competition after exami- nation, which would naturally include N. C. Officers, and men with Gunnery certificates, will be made by the Commanding Officers of Artillery Corps, giving due weight to the opinion of the Subaltern Officer of the division, who will send in the names of the first-class men of his division, ten men so selected from each division will compete.

All Officers, Non-commissioned Officers, and Gunners, in the bat- tery, should attend practice and work the guns. The first-class men only to lay them and gain the prizes. The prize to be personal to the individual laying the gun as a marksman, not to the whole de- tachment, which should, however, as a rule, be composed of men of the same sub-division as the man competing, and selected by him; the honor will be shared by the detachment as mistakes in drill or delay will affect the points gained by the marksman.

PRIZES.

The number and value of money prizes, must be determined by the ammunition and money available. The smallest proportion as a symmetrical arrangement would be one 1st. prize for each Field battery, four 2nd. prizes, one for each sub-division. Garrison batteries having only 40 men, one 1st. and two 2nd. class prizes, one for each division.

1st Prize.—The best shot in each battery, a badge of cross-guns with a crown above. Money payment in addition.

2nd Prize.—Cross-guns with money prize for the four best shots in each Field battery, (1 for each gun detachment) two 2nd. prizes only for Garrison batteries, provided in all cases 50 per cent. of Non-com- missioned Officers and Gunners, are, in the opinion of the Inspector of Artillery, sufficiently well instructed.

These badges to be worn on the left arm above the elbow and chev- ron by Non-commissioned Officers, except sergeants who must wear it upon the chevrons.

The Non-commissioned Officers and men who compete, are to be exclusive of Trumpeters, and such employed men as would not be available for laying guns in action.

DRIVERS.

Prizes of the same value as for Non-commissioned Officers and Gunners might be given to the four most efficient Drivers, whose horses and harness are in good condition, one for each sub-division, provided the drivers of the battery were considered good in their special duties, by the Inspector of Artillery.

The Drivers to be classified annually in the same manner as Gun- ners. As a rule the general selection of the best Drivers for first-class,

might be left to the Subaltern Officers in charge of divisions, tempered by the opinion of the Commanding Officer. In the case of inexperienced or junior Subalterns, the Captain of the battery would make the selection.

The best driver in each battery, whose horses and harness have been in the best condition throughout the training. Money prize, and badge of Cross-whips and spur.

The four best Drivers in each battery, whose horses and harness were in good condition during the training. Money prize, and badge of Cross-whips.

The badges and prizes to be held only for one year. Every year a fresh classification. Should it be found that a Gunner has forgotten his drill, or knowledge of fuzes, &c., he will be necessarily excluded from the first-class and from competition. A Driver grown negligent and careless would also find himself in the second class, though he might have held a prize the year before.

PRACTICE.

Only 20 Non-commissioned Officers and Gunners, are to compete for the Gunnery Prizes in each Field battery. In the Garrison battery 10 will compete. If the amount of ammunition does not permit, the number must be reduced.

If range-finders are not used, one trial shot from each nature of gun, at each range would be required, to place the first and last competitors on an equality. The trial round should be laid by an Officer, on the target, without making any allowance for wind.

Shots striking the guys only will not count as hits. Ricochet hits at sea the same as on land range. In firing at floating targets it is impossible to prevent their moving to the right or left as the tide ebbs and flows, it must be understood that no complaint of the tide having shifted from this cause can be entertained.

When the target has been shot away or sinks and cannot be replaced at once, the practice is to commence again when it has been derived, by either those who have fired, or those who are about to fire, from the accident having occurred.

The guns at commencing for Field Artillery to be unlimbered, ammunition in the limber boxes, fuzes not fixed or bored. Garrison ordnance to be in the position of guns run back by recoil; the stores at the guns; the detachments at "take post at the guns," or "under cover" where there are parapets; the guns to be run up before firing to a proper distance from the hurter, the distance to be indicated by a chalk line on each platform.

In running up the gun, great care is to be observed by the No. 1, to prevent the trucks from striking violently against the hurter, as it causes the projectile to start forward, and leave a space between itself and the cartridge, which is dangerous after running up, and moreover renders traversing difficult with standing carriages.

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Each man competing is to fix his own fuze, and lay his piece without verbal assistance. Officers must be particular on this point. Any one detected giving or receiving assistance to be excluded from competition, in addition to punishment for disobedience of orders. This does not apply to one man of the detachment No. 13 selected by No. 1 to judge effect of fire, or to the points for direction called out after each round by the Officer marker at the battery.

ORDER OF FIRING.

Lots to be drawn for the order of firing, beforehand, and not divulged until the competitor is called out by the Officer superintending.

RANGE OFFICER.

The Officer on range is alone responsible for points given for elevation and fuze. No appeal.

If the practice is at a floating target, and he is ordered to place himself in position along the shore, he will have to take up a point as nearly as possible, at right angles to the line of fire, as best calculated to ensure a correct estimate for elevation and fuze credit.

If he is ordered to take up a position by boat, or proceed to a fixed target on an open range, the distance he will have to keep from the line of flight must depend entirely on the projectile to be used.

With solid shot the range party would be safe at a distance of 200 yards to the flank, and at right angles to the line of fire. In this case the result can be seen without visiting the target, when it is necessary to visit the target the Officer will put up the danger flag, and sound cease firing, when it is repeated from the battery and the firing flag lowered, he can go and examine the target, lowering the danger flag and sounding commence firing when he has returned to a place of safety.

With common shell of ordinary calibre, and bursting charge, a distance of not less than 500 yards to the left flank, is the best and safest position, the distance from the line of fire increasing with the range. With Shrapnel shell about the same distances can be observed, as with this projectile premature explosion now and then arises, and the bullets as they lose velocity have a great tendency to spread outwards and cover ground.

The range party should always be at right angles to the line of fire and on the left of the target with rifled guns, as the tendency of ricochet due to rifling rotation is to the right.

It is seldom practicable to place the range party in absolute safety from splinters of shell; with large bursting charges, and there are few situations where it is advisable to use bursting charges, blowing charges would therefore be the rule.

POINTS.

A shot to have no value unless it obtains points, both for elevation and direction. A direct hit on the target shall count 5, and a ricochet hit 1 point extra. Thus, a direct hit will count 12; a ricochet hit 4, 5, 6, 7, or 8, according to the position of the first graze. A ricochet hit out of bounds will count nothing. A first graze within the bannerols nearest the target to count—

For elevation, 4.

" direction, 3.

Within the second bannerols—

For elevation, 3.

" direction, 2.

Within the outside bannerols—front and rear of target.

For elevation, 1.

A shot may get a maximum for elevation, and minimum for direction; or vice versa. Thus, if it strikes in line with target, but only just inside the last bannerol in rear, the credit will be 4, i.e. direction, 3; elevation, 1.

MARKER AT BATTERY.

The Officer in charge of the marking at the battery, is alone responsible for points given for direction, right or left. No appeal.

On all other matters the decision of the Officer superintending the practice, to be final. No appeal.

It would be desirable when practicable to use the British army system of signals when required by range party and battery: but the results of the shot are not to be signalled, or the competitor told the errors of elevation until the whole practice is over. Judging effects of fire for themselves, is a very valuable part of the practice. But as the sight of No. 1, may be obscured by smoke and he would lose time in going a distance to avoid it, he may be told the points given for direction at the battery, and may select one of his detachment to judge the distance over or under and inform him of it, to enable him to correct his elevation for the next round if he thinks fit.

PERCUSSION FUZE.

As the action of a percussion fuze does not depend upon the gunner (when once the safety plu has been removed) credit can be assigned only to such shell whether bursting or blind as for solid shot.

TIME FUZE.

Credit given according to the position of the shell at the moment of bursting, or explosion of the blowing charge, with time fuze, (as near as may be judged by aid of bannerols), so as to correspond with the points assigned for first graze of solid shot, provided no credit is given for any shell burst more than 20 ft. above plane.

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A common shell fuze to burst, or blow, near the object i. e., within second bannerols, not more than 20 feet above plane. A good time fuze to count 4 points in addition to points for direction and elevation. In case of a direct hit with common shell credit would be given as for solid shot, but none for fuze.

A fuze for Shrapnel shell to be considered good, if burst between the target and the outer bannerol, in front, i. e., not more than 50 yards short, or more than 20 feet above plane. Good fuze 4 points, in addition to credit for elevation and direction. Elevation credit for Shrapnel is inversely as its distance from the target at the moment of burst or graze if blind, inside 1st. bannerol 1; inside 2nd. bannerol 2; between last bannerol and target 1. provided always no credit is given for any shell burst or blown more than 20 f. above plane. In case of a direct hit or graze from a Shrapnel shell that did not burst, credit would be given as for solid shot, but none for fuze.

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MORTARS.

A shell, falling within a circle of 20 yards radius, to count 4 points. A mortar time-fuze acting almost simultaneously with impact to count 4. A proportionate credit of 3, 2, or 1, to be assigned to a fuze short or long, 5, 10 or 15 seconds.

TIME.

The following is the time allowed for firing one round from the different classes of guns, including fuze adjustment:—

S.B. field guns, 1 min.

Rifled field guns, 1 min. 30 sec.

All S.B. guns, on siege, or standing garrison carriages, 2 min. 30 sec.

Rifled guns on standing carriages, 3 min.

S.B. guns on dwarf traversing platforms, 3 min.

B.L.R. guns on dwarf traversing platforms, 3 min. 30 sec.

7-inch M.L.R., 4 min.

9-inch " 4 min. 30 sec.

10-inch " 5 min.

Mortars, 13-inch, 4 min.

" 10-inch, 3 min.

" 8-inch, 2 min.

A reduction of one point should be made for every 30 sec. of time beyond the time allowed. The whole of the rounds to be fired by each competitor must be fired in succession, the Officer time keeper giving the time for the whole, deducts such periods as may be allowed by the Officer superintending for delays not the fault of the detachment.

TIES.

In case of ties. When the ties are both within the time allowed, the marksman making the score in the shortest time, shall be the winner. When ties are absolutely the same, the senior soldier wins.

SUPERINTENDING OFFICER.

The Officer superintending practice will keep the firing flag up while firing and sound commence firing as soon as the danger flag of the range party is lowered and the range clear. He will be informed of this by the Officer marker at the battery who must use a field glass or telescope, and immediately report any obstruction in the range even if not notified by the range party. When the range is obstructed the firing will of course cease and the time be noted by the time keeper, that the delay may not count against the competitor then firing.

DRILL.

Every movement must be steadily and correctly performed in strict conformity to regulations; the slightest deviation therefrom must be at once checked, and the movement recommenced, in which case the time lost will not be allowed for. Time shall be allowed for any unavoidable delay, such as a misfire through breaking or fault of friction tube, or anything that is not the fault of the No. 1, or his detachment, according to the decision of the Officer superintending the practice; the command "Stop" shall be given, and the time taken by a watch, or time of flight instrument, till the word "Commence" is again given, when the numbers shall resume the exact position in which they stood at the word "Stop," and proceed with the working of the gun.

THE TARGET.

On water ranges the target is composed of a cask with a flag pole 10 feet high, this height is convenient when firing shell with time fuzes, serving as a guide to determine the height of burst above plane. The flag pole runs through the centre of the cask and cross shaped float on which the latter rests bolting the arms together. The float is composed of six pieces of plank each 12 feet long bolted or lashed together in the form of a cross, with arms 15 feet long bolted or lashed together in the rope to keep the cross pieces at right angles. Guys from the flag staff to the ends of the cross give additional stability to the flag staff which would be kept upright by slinging a shot, shell, or stone, by the anchor rope made fast to the centre of the cross, and at such a depth as not to touch bottom. Stones, shot, shell, or anchors, would also be required from the extremities of the cross pieces to keep them at right angles to the line of fire, through these cross pieces 4 bannerols, two 5 and two 15 feet from the target mark direction for rifled guns. The nearest over and under bannerols 15 feet from the centre on the ends of the planks in the line of fire. For S. B. guns these distances should be by yards instead of feet. For the outer bannerols separate small floats or casks would have to be anchored. The diagram shows the arrangement of bannerols for judging credit for elevation and direction.

the firing flag up while the danger flag of the 1st will be informed of the must use a field glass in the range the range is obstructed noted by the time keeping competitor then firing.

correctly performed in deviation therefrom not recommenced, in or. Time shall be allowed to fire through break is not the fault of the decision of the Officer "Stop" shall be given, that instrument, till the numbers shall resume word "Stop," and pro-

ask with a flag pole 10 shell with time fuzes, 1st above plane. The cross shaped float on The float is composed washed together in the swifted together with yds from the flag staff to the flag staff which stone, by the anchor such a depth as not to could also be required am at right angles to erols, two 5 and two ed guns. The near- ntre on the ends of se distances should rols separate small The diagram shews t for elevation and

The distances apart being feet for rifled guns and yards for smooth bore. The 2nd bannerol, which should always be 90 yards to the front from the target centre for smooth bore, will mark the limit of effective shrapnel bursts. For rifled guns this limit will be marked by a 4th bannerol, placed at 90 yards from the target. On land or ice ranges it will be very easy to arrange targets and bannerols as above; difficulty in strong wind or tide ways may arise, experience will probably suggest modification. The Cross float for instance, might be bolted together so as to shut like a pair of scissors for convenience in towing out.

B

120

B

25

B

15

B 10 B 5 T 5 B 10 B

15

B

75

B S. E. Shrapnel limit.

60

B

Gun.

The whole of the above bannerols and floats might be dispensed with, if the Artillery practice register or Alidade were adopted; an economical instrument that marks accurately on paper the exact distance from the target of shot grazes or shell bursts. Where it is found impracticable to place bannerols, credit must be assigned for elevation and direction by the range and battery officers respectively, as in the Royal Navy, when a single eask target is used.

RANGE.

It would be advisable to vary the range, but the small amount of ammunition available, renders it impracticable. The ranges can therefore be only varied annually. For the present year the following are proposed:

9 Pr. M. L. R., field guns	from 1300 to 1400 yds.
9, " " S. B. " "	1000 to 1200 "
32 & 24 Pr. S. B. guns	" 1200 to 1400 "

T. B. STRANGE, LT.-COL.
Inspector of Artillery.

ADDENDA.

- Page 6 or 36, 1st line, after the word "shot," insert "or shell."
 2nd line, instead of "shall count 5," read "shall count 3."
 3rd line, instead of "will count 12," read "will count 10."
 Last line, after "above plane," insert "or grazing out of bounds & c., outside 3rd bannerol from target."
 Page 7 or 37, 7th line, instead of "more than 50," read "more than 90."
 11th line, after "burst," insert "in front of target."

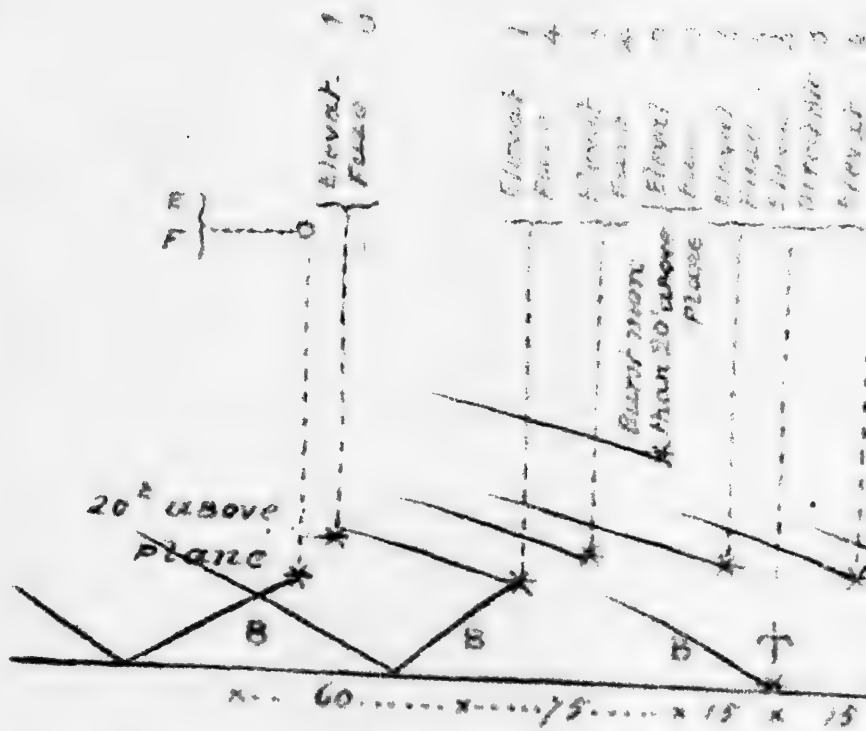
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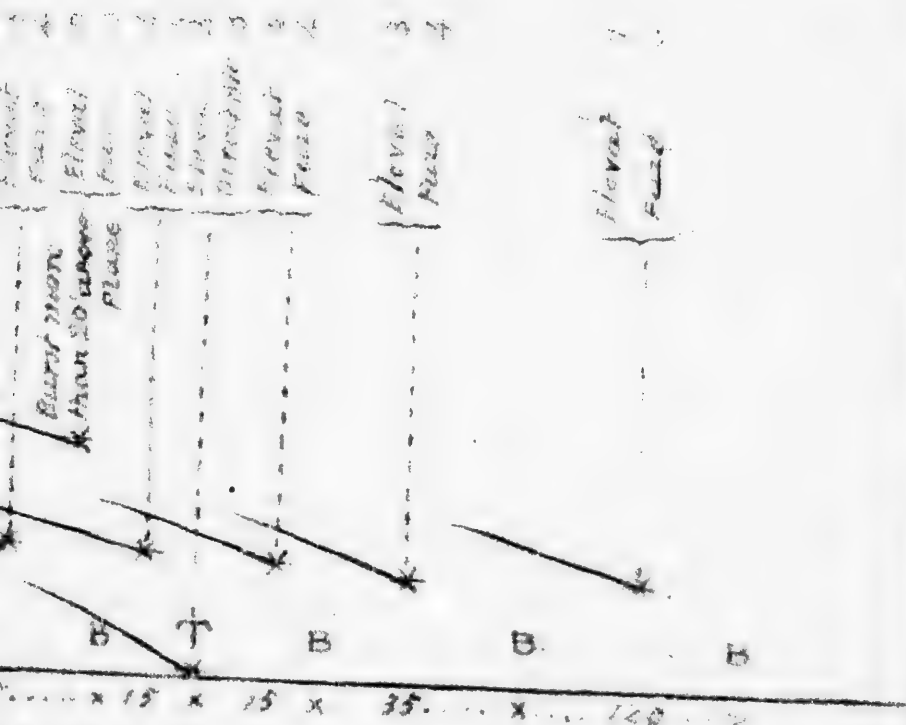
to 1100 yds.
to 1200 "
to 1400 "

NGE, LT.-Col.
ector of Artillery.

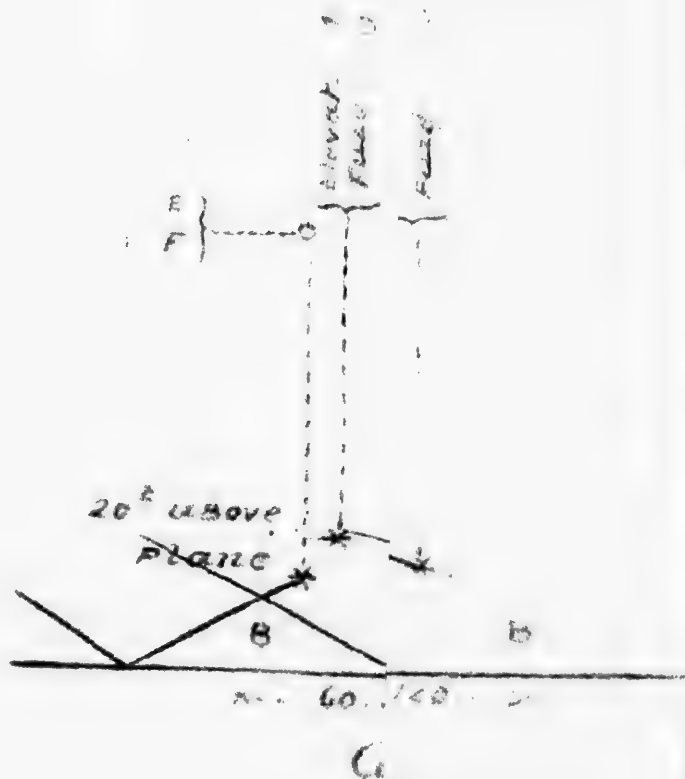
sert "or shell."
," read "shall count
," read "will count
insert "or grazing
bannerol from tar-
," read "more than
n front of target."



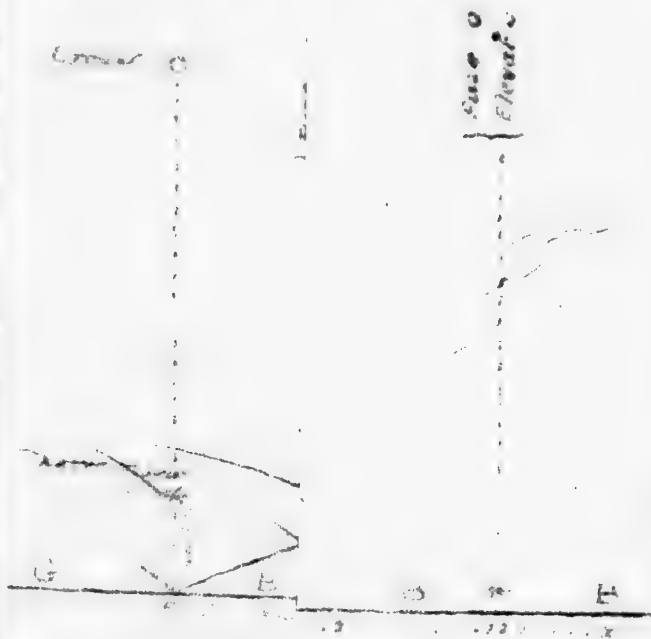
Common Shell with li



shell with time fuze

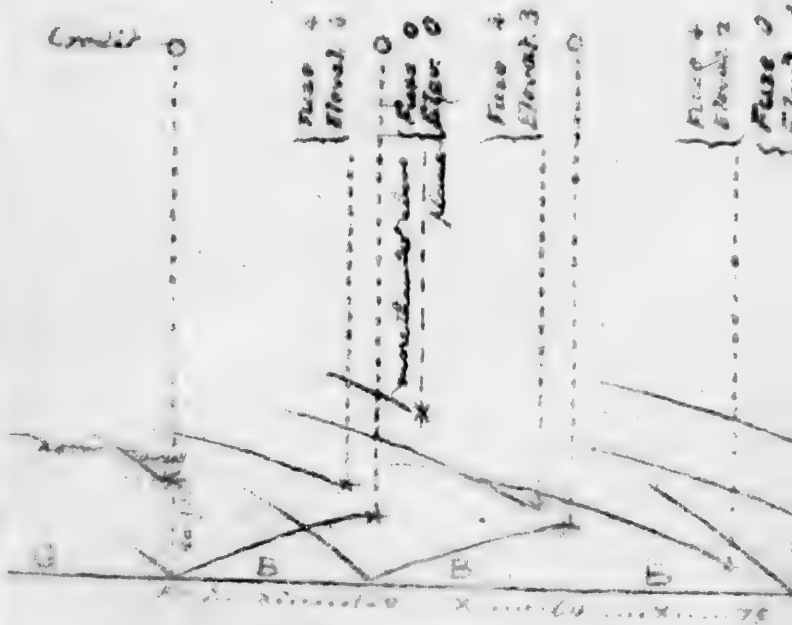


A line drawn to the north
 The middle of it



G. Corner
 B. Elev. 0
 F. Target

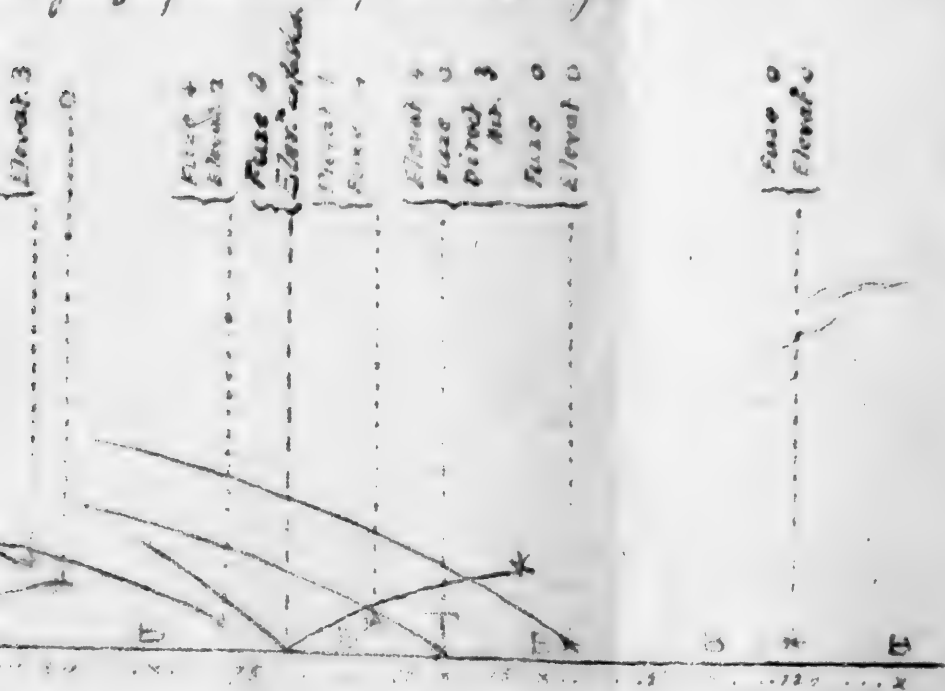
It shows grazing in front of Target before sunset
 No credit for Sharpshooter's grazing or the



S. ...
 O. ...
 T. Target.

Rifle Guns

Target before hunting to get a position on the wind
 in grazing or hunting "down target"



1770 Green's Sharpshoot.

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TACTICAL.

SECTION II.—Definitions—Standing Gun Drill—Manceuvres.

DEFINITIONS.

The tactics of Field Artillery cannot be separated from those of other arms, therefore an Officer commanding a Field Battery must have a good knowledge of all arms.

A Rank.—Two or more soldiers placed side by side in line.

A File.—Two soldiers placed one behind the other in line.

Rank and File.—A term meaning strictly all men told off in the ranks, but generally used to denote corporals and privates.

Files.—This term is made use of to denote the strength of the frontage of a body of troops.

Fours, Column of (infantry).—Four men abreast: 2 front and 2 rear rank men.

Fours, Column of (cavalry).—Eight men abreast: 4 front and 4 rear rank men.

Fours, Sections of (cavalry).—Four men abreast: front rank and rear rank alternately.

Half sections of (cavalry).—Two men abreast: front rank and rear rank alternately.

Section (infantry).—The $\frac{1}{4}$ th part of a company.

Subdivision (cavalry).—Half a division.

" (artillery).—One gun, with its detachment, horses and wagons complete.

Division (artillery).—Two subdivisions. The division bears the same relation to the battery, as the squadron to the regiment, the company to the battalion. The two guns of a division should never be separated.

" (cavalry).—The $\frac{1}{4}$ th part of a squadron.

Company.—About 100 infantry soldiers, commanded by a captain.

Squadron.—About 150 cavalry soldiers, commanded by a captain.

Troop.—An old and natural definition for a cavalry captain's command.

† A Squadron is supposed to consist of 2 Troops with their respective Captains, commanded by the senior. It is an unnatural Cavalry unit.

Battery.—Six guns (in Canada 4 guns with waggons, spare carriage, etc.) If a six gun battery has to be subdivided, it ought to be subdivided into divisions, not half-batteries.

Battalion.—3 or 19 companies, (In the British Army a Regiment, sometimes with two Battalions separately organized.

Regiment (infantry).—As above.

Brigade (Artillery*).—Consists of two or more batteries. When more than three batteries are present, it is formed into brigade divisions, of two batteries each.

Brigade (Cavalry).—3 Regiments.

Brigade (Infantry).—3 Battalions.

Division of all Arms.—2 Brigades of Infantry, 1 Battalion of Rifles, 1 Regiment of Cavalry, 3 Batteries of Field Artillery, 1 Infantry and Artillery Reserve Ammunition Column, 1 Company Royal Engineers, 1 Troop Military Police, Medical Department.

Army Corps.—3 Divisions. 1 Brigade of Cavalry, Corps Artillery, 5 Batteries (3 light, 2 heavy) in addition to Divisional Artillery. Army Corps Ammunition Reserve, in 3 Divisions. Corps Engineers:—1 Pontoon Troop, 1 Telegraph Troop. 1 Troop Military Police, Medical Department.

A Line.—Bodies of Troops placed side by side.

A Column.—Bodies of Troops placed behind each other. The term column or open column implies wheeling distance or such amount of space (between each body), as that the length, together with the breadth of the column, shall represent the frontage when wheeled into line.

Half Column.—A column closed up to half the distance laid down for column.

Quarter Column.—A column closed up with four yards clear between each body.

Column of Route (Artillery).—A column formed with a front of only one carriage, and applies to line of march.

Double Column.—A formation of two columns.

A Line of Columns.—A line of two or more batteries, half-batteries, Divisions, Battalions or squadrons in quarter column.

Mass of Columns.—A column of two or more brigades, &c., in quarter column.

Direct Echelon.—Is when the line is broken into several parts, moving direct to the front or rear, in succession, thus:—

* 6 or 7 Batteries R. A. are formed into an administrative unit.

aggon, spare carriage, subdivided, it ought to be half-batteries. In the British Army a Regiment, is separately organized.

more batteries. When present, it is formed into each.

7, 1 Battalion of Rifles, 2 of Field Artillery, 1 Ammunition Column, 1 Troop Military Police,

1 Cavalry, 1 Corps Artillery, in addition to Divisional Ammunition Reserve, in 1 Pontoon Troop, 1 Telegraph, 1 Medical Department.

each other. The term distance or such amount of length, together with frontage when wheel-

the distance laid down

four yards clear be-

med with a front of

batteries, half-batteries, or column.

more brigades, &c., in

into several parts, thus:—

administrative unit.

Oblique Echelon.—Is when the line is broken into several parts by wheels from line to column, less than the quarter circle, so as to be oblique to the former front, and parallel with each other, thus:—



Alignment.—The line between two given points, or in prolongation of two points given as a base.

New Alignment.—The line on which the Column is marching, after it has wheeled, or changed its direction.

Formation.—The act or method by which a body places itself in position.

Deployment.—The formation of Line from Column.

Flank.—The outer extremity of any body of men. Also the direction to either hand of a body moving.

Pivot.—The Flank man or gun on which a body wheels.

Fixed Pivot.—When the pivot man or gun, during the wheel, turns upon the same ground.

Moveable Pivot.—When during the wheel the pivot man or gun describes a portion of a circle.

Pivot Flank.—In column of Companies, Batteries, Half-batteries, &c., that Flank on which the troops are working, and on which the Officers commanding are posted.

Outer Flank.—The opposite flank to the pivot.

Point of Formation.—A fixed object or marker, on which a formation commences.

Base.—Two men placed at a distance apart, on which depends the proper frontage of a line, or covering of a column. "Alignment Base" is the term used in the former case; "Covering Base" in the latter.

A "Base" Body.—Is that on which a formation is made, or when in movement, that on which the dressing is, thus—"Base Battery," "Base Division," or "Base Company."

Fixed Base.—Standing base, on which the formation is made.

Moving Base.—The base on which the dressing depends in movement.

Extent of Frontage.—The distance between the outer flank men of any formed body.

Depth.—Distance from Front to Rear.

Distances.—The Space between bodies from Front to Rear.

Intervals.—The Space between bodies from side to side.

A Horse's Length.—A term of measurement (8 feet).

Change of Front.—The throwing forward or back of either flank of a body on a fixed base.

Change of Position.—A line moving and re-forming altogether off its ground, to front or rear, either square to the former front, or with a flank thrown forward.

Close Order.—The ordinary distance between front and rear rank.

Order.—The increased distance taken by the rear rank on occasions of parade.

Dressing.—The act of correctly aligning on a base.

When the term "*Dress*" is used, it is the correction of an imperfect dressing; when "*Dress up*," it is for a rank to move up to and dress by another formed line.*

Covering.—The act of a body placing itself correctly in rear of another.

Oblique March.—Gaining ground to front and flank simultaneously.

Flank March.—Gaining ground to a flank only.

Taking Ground.—Moving to a flank, each carriage or body of men, wheeling independently, at right angles to its previous position.

Wheeling or Shoulders forward.—A body bringing forward a flank on a fixed or moveable pivot.

"Right" or "Left."—These terms are used to complete the wheel to the half or quarter circle, after having wheeled "*Half*" or "*Quarter*," "*Right*" or "*Left*."

Paces.—The denomination of different degrees of speed, also a measurement of distance.

Markers.—Non-commissioned Officers employed to give bases, and mark points.

Body of Direction.—Is the body on which the dressing or direction of the rest depends.

Alarm Post.—The place (previously indicated) where troops assemble when ordered to turn out suddenly.

Parade Movements.—The movements laid down for the inspection of a regiment or body of troops.

Parade Line.—The line of original Formation, from which the Reviewing Officer is received and saluted.

Passing Line.—That opposite the Parade Line, the centre of which is the Reviewing Officer's Post.

Recruit, Squad, Arm and Sword Drills are found in Infantry or Cavalry manuals, and will not be dealt with in the present work.

INTERVALS.—1. Between files when formed in squadron, 6 inches from knee to knee.

2. Between the guns of a battery in line, full intervals, 6 horses 20 paces, 4 horses 15 paces.

3. Between squadrons in line. The breadth of a division, but never less than 12 paces.

* Guns can only dress up. If too far forward they must reverse and come up again.

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 a front and rear rank,
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 squadron, 6 inches
 intervals, 6 horses 20
 a division, but nev-
 they must reverse

4. Between cavalry regiments in line, or between cavalry and in-
 fantry in line, as for squadrons.

5. Between battalions in line, 80 paces.

6. Between batteries in line, or between artillery and other troops,
 30 paces.

7. Between cavalry regiments in contiguous columns, as for squad-
 rons.

8. Between Battalions in contiguous columns, 12 or 30 paces, as
 ordered.

DEPTH OF TROOPS.—1. A regiment of cavalry, 2 ranks, in line at
 close order, 8 yards.

2. A battalion, 2 ranks, in line at close order, 2 yards.

3. A battery, in line, at close order, with waggons, 34 yards. If
 without waggons, 15 yards.

4. A cavalry regiment, 4 squadrons, in quarter distance column,
 56 yards.

5. A battalion, 10 companies, in quarter column, 65 yards.

EXTENT OF FRONT OF TROOPS.—1. The front of a squadron is
 equal to as many yards as it contains files.

2. The front of a battery in line, at full intervals, is calculated by
 multiplying 20 by one less than the number of its guns; e. g. the
 front of a battery of 6 guns is 20×5 , or 100 yards.

3. The front of a company in paces is eight-tenths the number of
 files it contains.

MEMORANDA.—1. A regiment of cavalry in line, 4 squadrons of 150
 men each, occupies a front of 350 yards.

2. Eighty-four guns (14 batteries) occupy about a mile.

3. Four batteries occupy about 500 yards.

4. The front of a battalion of 850 men in line is 300 yards.

5. A battalion of 850 men, in skirmishing order with 6 paces inter-
 val, covers about $\frac{1}{2}$ mile.

6. A single company of 85 men, in skirmishing order with 6 paces
 interval, covers about 212 yards.

7. The following was the rule used by the Duke of Wellington in
 calculating the ground occupied by troops, and the time required to
 get them into position: "Every infantry soldier occupies 2 feet of
 front; therefore, as the men are in two ranks, every man may be
 said to occupy 1 foot; therefore 5000 men occupy a mile; and conse-
 quently it will require the same time that a man can march a mile
 to bring up the rear of a column of 5,000 men to the point from
 which the head started."

8. An infantry soldier carries 60 rounds of ammunition. At 2 shots
 a minute, this would be exhausted in half an hour.

9. A battery carries in the gun-limber 80 rounds of ammunition.

At one shot a minute, this would be exhausted in half an hour.

A waggon contains 120 rounds of ammunition.

DRILL.

Field Artillery Drill is of three kinds, viz:—

1ST MANŒUVRE DRILL.—For the sake of giving steadiness, discipline, and nerve to all ranks. The gunners learning to handle the pieces with celerity, safety and confidence, and the drivers to move their horses accurately without chance of accident or collision. The Officers learning to handle the whole Battery, men, horses and guns, with cool dexterity, even at a rapid pace, in spite of noise and dust, to avoid confusion or collision between sub-divisions or other troops. But it must be borne in mind that nothing likely to produce a bad habit in war is to be practiced in peace. For instance—a gun is never to be banged off with blank ammunition, without pointing that something, no matter what. The only excuse for rapid shot is supposed to be used, when not much accuracy is necessary, from the spread of the balls, and the supposed proximity of an enemy. Therefore, when the Officer wishes a rapid fire even with blank, he should give the word as with case &c. In all other instances, even at show manœuvres with blank, the guns should be steadily pointed before being fired and generally fired in succession from the flank the wind blows to, so as to clear off smoke. In fact war is never to be lost sight of even in the shew movements of soldiers.

2ND OBSTACLE DRILL.—This kind of drill includes marching with the least possible expenditure of men, horses and material; over coming obstacles—fences, ditches, ravines, streams, going up and down hill, turning in narrow roads, etc. The main thing to be remembered is always to dismount the gunners, and endeavor to avoid accidents to men, horses or material.

3RD FIGHTING DRILL.—The third kind includes practically the two previous as also the power of instructing others in the method of giving effective fire; it is a large subject embracing the choice of position and position, &c., when to move, where to move, how to move; what to fire, when to fire, etc., and requires a vast scope of knowledge in the commander of a Battery, who should with a decisive character, young and vigorous physique, combine the calmness of age, and the coup d'œil of a general. He often has to act decisively, and often with unimportant result to the other arms he is working with. What the Captain of the war chariots was in ancient fields of battle, that and more may be the Captain of a Field Battery; or he may be a King's Log, who will often escape censure from those who are incapable of judging what he might have done, and be blamed for losses that have been a great gain to his comrades of the other arms.

Preliminary Remarks.

In imparting instruction in Artillery drills, it should be borne in mind, that in every change of numbers, men have to learn different duties and handle different implements from those they were previously engaged with; the duties again vary with the several natures of ordnance. It is therefore impossible that such a variety of exercises can be well executed, unless the *object* of the various duties is comprehended.

Long explanations relative to the position of the body are to be avoided, the drill instructor should either place each man in the position he is to occupy in the performance of his duty, or himself show how the duty is to be performed.

Great patience and the utmost precision are necessary on the part of the instructor. He should more especially endeavor to excite a spirited and active deportment in the squad; and, above all, be particularly careful not to dwell too long on any one point in the drill. A portion, therefore, of each lesson should be devoted to the theoretical instruction, and to an explanation of the different parts of the guns, carriages, and ammunition which are used, pointing out the laying, preparing shells and fuzes, judging distances, and the use of these several projectiles at proper ranges. This instruction may be given at intervals, during the time the ordinary drills are being learnt.

It is to be distinctly understood that no recruit is to go to practice until he has been well instructed in laying guns, in boring fuzes, and in preparing shells.

In the service and exercise of the various descriptions of ordnance the same Nos., as far as possible, always perform the same duties.

The instructor should ascertain that each No. is at his post by proving. This he does by calling out No. 1 "*Prove*," No. 2 "*Prove*," &c. The man called upon raises his right arm and extends it smartly to the front, hand open, thumb upwards, hand as high as the shoulders. When the next No. is called he drops his hand. The last No. lowers his hand at the word "*Down*."

On all occasions before giving a word of command, No. 1 should repeat the number of his gun.

At the sound or order "*Stand fast*," when a gun is loaded with ammunition, it will remain so, if in the act of being loaded, the loading will be finished and the gun not fired until the order to recommence firing is given.

At drill or exercise on the order "*Stand fast*," every No. will remain steady in the position in which he is.

Loading should be performed as rapidly as is consistent with the proper performance of all the duties, avoiding confusion.

The cartridge should be kept covered until the sponge is out of the bore.

A sponge for rifled guns should be high, it should be allowed to take the twist of the rifling, and forced to the bottom of the bore.

PART I. SEC. II.

DRILL.

The sponge should be kept well damped, as the loading is thereby facilitated.

If a shot jams in the bore, and cannot be got out by lowering the muzzle, the cartridge must be drowned and the charge blown out by the introduction of a small quantity of powder poured into the vent by hand, *not from the powder horn.*

No gun is ever to be fired without the order of No. 1.

Explanation of Terms,

Before proceeding to instruct in laying, it will be necessary to explain everything connected with the sights and scales, also certain terms, such as axis of the gun, axis of the trunnions, line of fire, line of sight, trajectory, range, elevation and depression, deflection, and velocity.

Should it be necessary to make use of such terms as parallel, right angles, horizontal, vertical, &c., they also must be explained, if necessary.

Axis of the Gun.—The axis of a gun is an imaginary line passing down the centre of the bore.

Axis of the Trunnions.—Is an imaginary line passing through the centre of the trunnions at right angles to the axis of the gun.

Line of Fire.—Is the prolongation of the axis of the gun.

Line of Sight.—Is the line passing through the notch of the tangent scale and tip of the fore sight to the object.

Trajectory.—Is the line made by the shot in passing through the air.

Range.—Is the distance from the muzzle to the second intersection of the line of sight and the trajectory.

Elevation or Depression.—Is the angle formed by the line of fire and line of sight.

Deflection.—Is the lateral error or distance the projectile strikes to the right or left of the object measured horizontally, in feet, or the distance right or left measured in minutes on the deflection scale of the gun, to compensate for that error.

Velocity.—Is the rate at which a shot moves. Initial velocity is that with which it leaves the bore of a gun. The force with which a shot strikes depends on its weight and velocity.

Sights.—The following sights are used with the M. L. R. Gun.

Hind-Tangent Scale; Fore or Muzzle Sight.

Scales.—The hind tangent sight is marked with a scale for elevation, and fitted also with a scale for deflection.

Scale for Deflection.—The scale for deflection is a horizontal scale graduated to show minutes.

To adjust the Scale for Elevation.

The hind sight is raised until the mark for the required number of yards is in line with the top of the socket in which the scale slides, and clamped. The tangent scale must not be put down before firing.

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SEC. II.

DRILL.

49

TO LAY A FIELD GUN.

To lay a gun is to direct it in such a manner that the top of the notch of the hind sight, the apex of the foresight, and the object are in line.

The scales having been adjusted as explained, No. 1 proceeds to lay the gun, he places himself in the rear of the gun, bringing his eye to a level with the top of the hind sight, and about 6 inches in rear of it; and when laying guns where it is necessary to stoop, places his feet so that the body is well balanced, steadying himself by leaning on the gun with his arm; and gives the necessary orders for elevating or traversing, until the gun is laid as above; with field guns he himself elevates or depresses

Much will depend on the Nos. who move the gun under the direction of No. 1. With practice and intelligence they will readily understand when the gun is to be moved fast or slow, much or little. The word of command will be a guide to them. When loud they will work fast, when low they will understand that the gun is nearly on the object and must be moved gently. When the noise of firing drowns the voice, the right hand (the left arm steadying the body on the gun) can be used to signal trail right or left; back of the hand up moved more or less to the right, means trail right more or less. Palm of hand up, moved to the left, means trail left, more or less as the hand is moved.

General Rules to be observed.—Get a clear view of the object, and see that the gun is approximately in the line of fire before looking over the sights.

Always lay as quickly as possible, as the eye will not then become wearied.



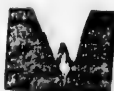
Full Sight.

Fixed Objects.—In firing at a target, invariably lay on the bull's-eye. The full sight should generally be used, and when a slight alteration of elevation is required it should be given by raising or lowering the argent scale, never by laying low or high, above or below the object, which is a fruitful source of error.



Half Sight.

Lay on the point to be struck with guns fitted with deflection scales; as all allowances for wind, difference of level in trunnions, should be made on the scales, not by laying high or low, right or left.



When one wheel stands considerably lower than the other, the gun will throw the shot towards the lowest side. The wind has considerable effect in causing the shot to deflect to the right or left, especially at long ranges.

Fine Sight.

Moving objects.—No man ought to be allowed to lay at a moving object until he has shown an aptitude for laying guns at a standing mark.

For beginners it will be convenient to take objects that move across the range in such a manner that the elevation may remain nearly the same; with skilled men the object can move obliquely across the range.

If the object is moved parallel to the front of the battery, the best rule is: first calculate the distance that the gun must be laid in front of the object, taking into consideration the range and rate of motion, and traverse in front of it just sufficiently to allow the gun to be fired deliberately, No. 1 giving the word "ready," (looking over the sights himself and avoiding recoil) gives the word "fire" when the object comes to the distance for which allowance has been made; the elevation being given with reference to the line on which the object is moving. If it is necessary to move the trail a second time, the elevation must be corrected.

In laying guns having a deflection scale, the allowance should be made on the scale, and the gun fired by No. 1 when the object crosses the line of sight, No. 1 looking over the sights and prepared to step clear of recoil.

It must be remembered that in firing at moving objects the ranges are constantly varying, and consequently the length of fire.

It is found in practice that the principal errors are those of elevation, arising from the fact that in laying ahead the gun is not truly on the line in which the object is moving.

Pointing unloaded guns at moving ships or boats should be practiced at drill by batteries near ship channels, No. 1 standing well in rear while pointing, to be clear of the recoil.

TO ADJUST THE SCALE FOR DEFLECTION.

Deflection is given to the right or left of the zero point, until the arrow points to the required number of minutes. The scale is then clamped. Deflection is always given on that side to which the shot is to be thrown.

* Difference in level of wheels in inches, (which can be found roughly by laying the sponge stave across the wheels), multiplied by the number of degrees of elevation, will give the required deflection in minutes towards the highest wheel.

Deflection for wind across range.—error in inches divided by the hundreds of range, will give required deflection in minutes.

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Practical Rule.—Each minute of deflection on the scale gives a difference of an inch in every 100 yards of range; thus, supposing that at a range of 2,400 yards, a projectile has struck 12 feet to the right of the object, it will be necessary to move the leaf 6 minutes to the left *i. e.* give "six minutes left deflection," to correct the error, because 12 feet = 14 inches; dividing by 24 (the number of minutes of yards in the range) gives 6. When ceasing fire care should be taken that the tangent scale be put down, and the deflection scale adjusted to zero, or it may lead to error when re-opening fire.

TO JUDGE DISTANCES.

As it is evident that the distance should be known in order to determine the required elevation and length of fuze, too much pains cannot be taken in instructing men to ascertain distances correctly.

In all positions there are many objects, the ranges of which are known, or may be ascertained by sextant, men may therefore be constantly exercised in range-finding and judging distances.

Range finders will be introduced on service; they should not be allowed to serve as an excuse for not teaching men to be quick at judging short distances, but should rather assist the instruction. Cases may arise where minutes may be of immense importance, and a readily guessed range of great use, though it is extremely difficult to guess the long ranges at which artillery usually fire. Accident might also disarrange the instrument, and much time and ammunition be wasted.

Ground is most deceptive, and the apparent distance varies with light, &c.; very little can in reality be ascertained by a trial shot.

STANDING GUN DRILL WITH R. M. L. OR S. B. FIELD GUNS.

The detachment consists of 1 Non-Commissioned Officer and 6 or 7 gunners, according to the number of horses, 4 or 6. With gun axle seats and saddles on the off horses, they form a portable gun detachment. The detachment falls in for drill two deep, in close order, about 2 yards in rear of the muzzle (the gun being limbered up), No. 1 on the left of front rank; The detachment is then in the position of "detachment rear."

TO TELL OFF.

Officer.

No. 1.

Tell Off.

"*Tell Off.*"—No. 1 takes a pace to his front, turns to his right, and numbers himself 1; the right hand man of the rear rank 2; his front rank man, 3; the second from the right of rear rank, 4; his front rank man 5, and so on; when all are told off No. 1 resumes his place.

TO UNLIMBER OR COME INTO ACTION.

A gun can be brought into action to the front, rear, right or left.*

Officer.	No. 1.
<i>Action front.</i>	<i>Action front.</i>
" <i>right.</i>	" <i>right.</i>
" <i>left.</i>	" <i>left.</i>
" <i>rear.</i>	" <i>rear.</i>
	<i>Limber drive on.</i>

"*Action front.*"—Nos. 1, 4 and 5 place themselves at the trail, 1 and 5 next the trail eye; 5 unkeys; 2 and 3 man gun wheels (without horses), 6 and 7 man limber wheels, till one yard clear of trail, when they push in rear; 7 or 8 goes between the shafts and manna them; the Nos. at the trail lift it clear of pin-tail; No. 1 gives "*Limber drive on.*" the limber is moved forward, then left-about, and when sufficiently to the rear, comes left-about again, and when ten yards in rear of and covering gun.

The trail is carried right-about and lowered to the ground, No. 5 shifting to the trail plate eye as soon as limber is clear, to avoid walking backwards. When the trail is lowered the Nos. come into action, and take post as follows, viz.: No. 1 unbuckles handspike and ships it, stands at the end of it; sees that the gun and fittings are in working order, and that the bore and vent are clear. No. 2 takes post outside and in front of right gun wheel, extends his right arm to receive sponge from 4, which he brings to his right side, and holds it at a slope of about 45°, the rammer head resting on the ground to his rear. No. 3 takes post in a similar position to 1, on the left side. No. 4 unbuckles sponge, and with right hand at centre of staff, and left at rammer head, casts it over axletree box to 2; No. 5 takes a similar position on the left side, takes the lanyard from the tube pocket (which is carried strapped on right side), doubles it in two, and draws it up under tube pocket strap. No. 6 takes post 5 yards in rear of, and covering left gun wheel. No. 7 in rear of off limber box, prepares to serve out ammunition. No. 8 (when there are 6 horses) in rear of near limber box, assists 7. The whole of the numbers turned towards the gun.

"*Action right.*"—The Nos. place themselves as in "*action front.*" the limber takes ground to the left, and when sufficiently far reverses to the left, and halts 10 yards from and covering gun; the trail is taken a quarter of a circle round to the left, (Nos. 1 and 4 changing round trail eye), and lowered; the Nos. then proceed as in "*action front.*"

* When a gun is limbered up the "*front*" is in the direction of the horses' heads, or points of the shafts; unlimbered, the "*front*" is in the direction of the muzzle of the gun.

PART I

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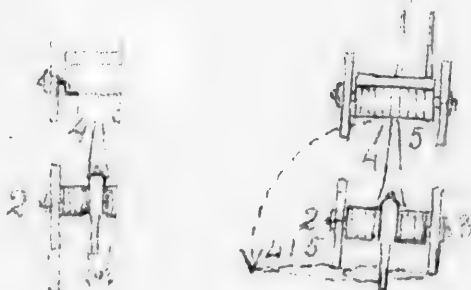
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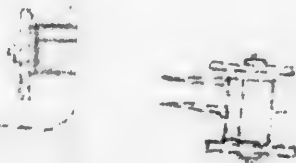
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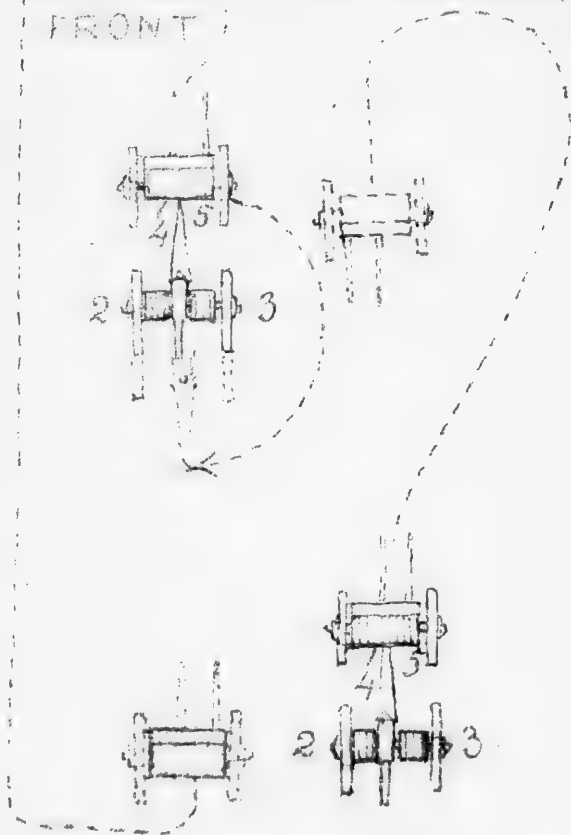


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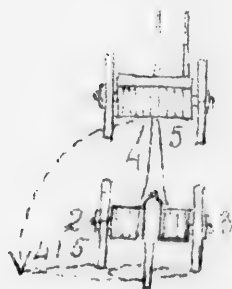
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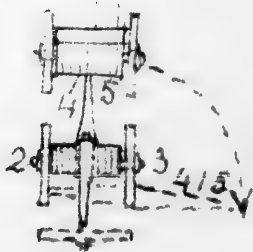


REAR

ACTION RIGHT



ACTION LEFT







REAR LUMBER UP

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FRONT LUMBER UP



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RIGHT LIMBER UP

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LEFT LIMBER UP



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SEC. II

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"*Action left.*"—The Nos. proceed as in "*action front,*" the limber when 1 yard clear, takes ground 1 to the right, and again reverses to the right, when sufficiently far; the trail is taken a quarter of a circle round to the right and lowered to the ground; No. 5 shifts round as in "*action front,*" the Nos. then proceed as before.

N. B.—"*Action left*" is the only case in which the limber reverses to the right.

"*Action rear.*"—The Nos. proceed as before; the limber moves off 1 yard, inclines to the right, and when sufficiently far reverses to the left, and halts 10 yards from gun and covering; the trail is lowered to the ground directly the limber is clear, and the Nos. come into action as before. No. 1 is responsible for the correct driving of his gun when it comes into action.

TO LIMBER UP.

A gun can be limbered up to the front, rear, right or left.

Officer.	No. 1.
<i>Front limber up.</i>	<i>Front limber up.</i>
<i>Right</i> "	<i>Right</i> "
<i>Left</i> "	<i>Left</i> "
<i>Rear</i> "	<i>Rear</i> "
	<i>Halt, limber up.</i>

"*Front limber up.*"—No. 5 goes to the trail eye; 1 to the right of 5, 4 to the right of 1; they lift the trail carrying it round half a circle to the left and lower it to the ground, Nos. 2 and 3 manning the wheels round at the same time; the Nos. then go under cover—2 and 3 between muzzle and wheels, 4 and 5 between breech and wheels, 6 in front of 2, the whole with their backs towards the axletree; No. 1 steps clear on the left side. The limber comes up on the right side of the gun, (without horses, 8 in shafts and 7 in rear of limber.) when square with trail,* No. 1 gives "*Halt, limber up,*" 2 and 3 man the gun wheels, and 4 and 5 lift trail by the handles, 6 bearing down the muzzle, 5 keys up, and the detachment forms the order of march. In heavy ground 6 and 7 would assist 2 and 3 to man the gun wheels.

"*Right limber up.*"—No. 4 lifts at trail eye, No. 1 on his left, 5 on the left of 1; the trail is carried round a quarter of a circle and lowered to the ground, and the Nos. go under cover; when the limber is square they proceed as before.

"*Left limber up.*"—The Nos. place themselves as for *front limber up*, and carry the trail a quarter circle to the left.

* The limber should never be backed, it is dangerous to the gun detachment, and the trail eye is liable to damage the limber boxes when backed on it.

"*Rear limber up.*"—The Nos. go under cover at once, the limber comes up "*right incline*" reverses to the left in line with trail, and when square No. 1 proceeds as before.

If the trail eye is raised to the height of the shoulders before turning, it has little or no weight, but it should not be violently thrown down.

N. B.—In limbering up or unlimbering, the limber always reverses or takes ground to the *left*, except for *action left*, when it cannot do so, or it would have to pass the front of the gun coming into action. The reasons are:—

1st.—It simplifies drill, being easy to remember.

2nd.—It is less difficult to horses, and easier to reverse square to the left than right, the driver easily keeping his horse up to the collar, (which is necessary to prevent too sharp a turn,) with his legs or spurs, throwing his whip over the off horse if necessary.

3rd.—When driving up to the trail on the right of the gun, for *front limber up*, the driver can more easily pass close to it, without driving over it, and perhaps damaging the fittings, which often happens when his off horse is between him and it, while the trail can be carried round to the left. There is danger of driving over the men should they fall with the trail, when both horses and men go in the same track.*

4th.—The horses learn the simple plan quickly and easily. The time for training artillery horses being very limited with the Canadian Militia, simplicity of manœuvre is of the first importance.

It is to be borne in mind that in fighting a gun on the Bengal Horse Artillery principle here laid down, it is generally desirable to make the horses bring the muzzle of the gun in the required direction, instead of halting for action front. When space permits, left reverse for action rear should be given, and the same principle may, to a great extent, be carried out in action right or left, by making the previous formation suitable to come into action by a left or right take ground.

POSITION AND GENERAL DUTIES.

No. 1 ships and unships the handspike, stands at the end of it, commands, bores and fixes fuzes when shells are fuzed at the gun and hands them to 3, lifts at the end of the handspike, in running up and back, and at the trail, in limbering or unlimbering.

Nos. 2 and 3 stand outside and in line with the front of the wheels.

No. 2 sponges, rams home, and mans the right wheel.

No. 3 loads, uncaps, or removes safety pin from fuze when in the bore, serves ammunition from axletree boxes, if required, and mans the left wheel.

* It is laid down differently in the R. A. Manual, for reasons that are not applicable to the Canadian Militia, *i. e.*, to assimilate to Horse Artillery; mounted gun detachments would be in the way of the trail going round to the left. These reasons are stated to fix the simple method in the mind.

PART I.

SEC. II.

DRILL.

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Nos. 4 and 5 stand in line with the breech, outside the 3
wheels.

No. 4 supplies 2 with sponge, and replaces it on the trail,
serves and drifts the vent,* pricks the cartridge,† tra-
verses at the end of the handspike, lifts at trail, and mans
the right wheel in running up or back.

No. 5 makes ready, fires, lifts at trail, and mans the
left wheel.

No. 6 stands 5 yards in rear of the left wheel, serves 3
with ammunition, hands shell to No. 1, when fuze at the
gun, lifts at the end of the handspike in running up or
back, and bears down the muzzle in limbering up.

No. 7 stands in rear of the off limber box, supplies car- 6
tridges and projec tles to 6 or 8, as the case may be, bores
and fixes fuzes, when the shells are fuze at the limber.

No. 8 (with 6 horses) stands in rear of the near limber
box, supplies 6 with ammunition, and assists 7.

No. 9 and supernumeraries attend to the ammunition
wagon, and refill the gun limber from it when necessary.

GENERAL DUTIES WITH REDUCED NOS.

3 Nos.—No. 1 points, commands, serves the vent, pricks
the cartridge,† makes ready and fires; 2 sponges and
rams home; 3 loads and traverses.

4 Nos.—No. 1 points, commands, makes ready and fires;
2 sponges and rams home; 3 loads; 4 serves the vent,
pricks the cartridge,† and traverses.

5 Nos.—No. 1 points and commands; 2 sponges and rams home;
3 loads; 4 serves the vent, pricks the cartridge,† and traverses; 5
makes ready and fires.

6 Nos.—No. 1 points and commands; 2 sponges; 3 loads; 4 serves
the vent; 5 fires; 6 supplies ammunition.

7 Nos.—No. 7 supplies ammunition to 6. The other Nos. as before.

8 Nos.—No. 8 assists 7, and supplies 6 with ammunition. The other
Nos. as before.

LOAD.

Officer.
Range — Yards.
With — Load.

No. 1.
With — Load.



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* In drifting the vent the gun is apt to be spiked by No. 2 with the
sponge. A drift with a shoulder, so as to prevent its projecting into
the bore, is to be used.

† It is not necessary to prick the cartridge to insure ignition; but
it is advisable to do so, especially in winter, as drift snow or ice may
form in the vent.

Load.—No. 1 communicates the directions which he receives from the officer as to the nature of projectile to be fired to 6 and 7, and when time fuzes are used, bores a fuze and inserts it in the shell, brought to him by 6. He adjusts the scale of elevation and deflection, and, as soon as the gun is loaded, lays it as laid down before. If the shell is fuzed at the gun, he receives it from 6, and hands it to 3.

No. 2 takes an oblique pace to the right with his right foot, then an oblique pace to the left with his left, then a side pace of 30 inches to the right with his right; he then enters the sponge head into the bore, shifts his left hand back under to the right, straightens right knee, forces the sponge up the bore, until his hands meet the face of the piece, shifts his hands to the rammer head, and forces the sponge hard home, bending over the left knee. He then gives the sponge two half turns, by first lowering his wrist and then raising it, at the same time pressing the sponge against the bottom of the bore. He next draws the sponge out about half its length, at the same time straightening the left knee and bending over on his right; then again bending over the left knee, and shifting his hands to the centre of the stave he bends outwards, withdrawing the sponge, and with the left hand close to the head, turns the sponge, keeping the right hand fast, but turning the wrist, and throwing the sponge head upwards with the left hand, with which he seizes the stave at the rammer-head. With light guns the sponge and rammer are pressed home with one motion. When No. 3 has put in the charge, 2 introduces the rammer head, brings his left hand to his right, and forces the charge home in two motions (as in storging), at the second motion throwing in the weight of his body, both arms extended as far as possible so as to keep his body clear of the muzzle. When home, (No. 2 can tell by the mark on the stave when the charge is not home.) He springs the sponge by jerking it out with his right hand, stepping to the right, and allowing it out with the through his hand; he then grasps it firmly in the middle with the right hand, and at the rammer head with the left, both knees straight, and quits the stave so as to be clear of muzzle. When the cartridge is home he springs the sponge as above directed, and steps back outside the wheel, first with his right foot, then with his left, and brings the right heel to the left; he brings the sponge stave to the slope, and the left hand to the side in the first motion of stepping back, and remains facing the gun.

No. 3 slews his body to the right, and brings his hands together to receive the ammunition from 6, the cartridge in his right, the projectile in his left hand, back of both hands down. As soon as the sponge is withdrawn he steps up to the muzzle, and puts in the ammunition, taking care that the 'choke' end of the cartridge is next the projectile, and that the seam does not come under the vent. If firing shell he uncaps the fuze, or removes the safety pin when the shell is in the bore. When shells are fuzed at the gun he receives them from No. 1.

No. 4 steps in, turns to his right, and places his left thumb on the vent, keeping his elbow raised, and his fingers on the left side of the gun. He only primes the cartridge if specially ordered, but not

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otherwise, should the cartridge not be home, he says, "Not home." If home he replaces the prick, and after No. 2 has sprung the sponge he places himself at once at the end of the handspike, and stands ready to traverse, which under ordinary circumstances he does with out pricking the cartridge.

No. 5 takes the lanyard from his belt, and hooks a tube to it, holding the lanyard in the left, the tube in the right hand.

No. 6 doubles back and gets a round of ammunition from 7 or 8, taking the projectile in his right, and the cartridge in his left hand, back of both hands up, choke end of cartridge against base of projectile, the cartridge covered by the right arm, projectile by the left, both arms folded across the chest, carries them up and gives them to 3; he then returns to 7 or 8 for another round, and halts at his own station till the gun is fired. When shells are fired at the gun he hands them to No. 1, the cartridge to 3, and returns for ammunition.

No. 7 attends at the limber and issues ammunition. When firing shells to be fired at the gun, he loosens the plug; if the shell is fired at the limber, he prepares and fixes the fuze. He should take care that the limber box is open as short a time as possible.

No. 8 assists 7 and issues ammunition to 6, which he gets from 7, holding the cartridge in his right, and the projectile in his left hand, backs of both hands down, choke end of cartridge against base of projectile.

TO LAY THE GUN.

Officer.

No. 1.

*Trail (right.)**" (left.)**Halt.*

No. 1 looks over the sights, gives the necessary elevation with the elevation screw, and "*Trail right or left*" as required, then lowers the tangent scale, if firing with more than 5° elevation, otherwise he only lowers the tangent scale at the word "*Cease firing.*"

No. 4 traverses with the handspike as directed.

TO MAKE READY AND FIRE.

Officer.

No. 1.

*Fire one round.**Ready.**Fire.**Run up or back.**Halt*

"*Ready,*" which No. 1 gives as soon as he has laid the gun, he steps clear of the wheel to that side where he can best observe the effect of his shot, 5 steps to the gun and presses the tube into the vent with his right thumb; steps outside the wheel, shifts the lanyard to his right hand, and extends it looking to No. 1, keeping his hand level with the vent.

No. 4 resumes his position outside the wheel.

"*Fire.*"—No. 5 draws the lanyard strongly towards his body without a jerk, and replaces it under his belt.

In the event of a misfire, No. 5 will go round to the front of the axletree on his own side, and from there drop in another tube, keeping clear of the muzzle, resuming the position of "*Ready.*"

No. 4, after the gun has been fired, steps in and clears the vent. As soon as the gun has been fired, No. 1, if necessary gives the order "*Run up.*" Nos. 2, 3, 4 and 5 man the wheels facing them, and turning them by means of the spokes, No. 1 and 6 lifting at the handspike. Should it be necessary to run the gun back, No. 1 gives "*Run back,*" when the same numbers move the gun. At "*Halt,*" each number returns to his place.

TO UNLOAD.

Officer.

No. 1.

Unload.

Nos. 2 and 3 man the wheels. Nos. 1, 4 and 5 raise the trail until the ammunition falls out. No. 6 takes back the ammunition to the limber. 7 must be careful not to replace in the limber a loaded shell with the safety-pin out of the percussion fuze.

TO CEASE FIRING.

Officer.

No. 1.

Cease firing.

Cease firing.

"*Cease firing.*"—No. 1 unships the handspike and buckles it on the trail, setting the scales at zero.

No. 2 throws the sponge over to 4, and turns to his right.

No. 3 turns to his left.

No. 4 receives the sponge from 2, putting the rammer head through the iron loop, and buckles the stave on the trail, and resumes his position outside the wheel turning to the front.

No. 5 turns to his left, and replaces the lanyard in the tube pocket.

No. 6 gives his ammunition to 8, and falls into his place.

No. 7 replaces ammunition. If shells have been prepared, he removes the fuzes, and screws the metal plug into the shell.

N. B.—No percussion fuze from which the safety pin has been removed, should ever be put in the limber, and time fuzes that have been bored and replaced in the limber, are apt to lead to error by overlooking the hole already bored.

No. 8 assists 7.

TO CHANGE ROUNDS IN ACTION.

Officer.
Change rounds.

No. 1.
Change rounds.

In changing rounds, No. 2 becomes 4, 4, 7, 7, 8, 8, 6, 6, 1, 1, 5, 5, 3, 3, 2.

POSITION OF DETACHMENT WHEN LIMBERED UP.

IN ORDER OF MARCH.

No. 1 in line with the point of the near shaft and two yards from it. When the guns are horsed No. 1 rides in line with leading driver, who holds his horse when he dismounts for action, and brings him round in limbering up.

Nos. 2 and 3 in line with the axletree of the gun carriage.

Nos. 4 and 5 in line with the centre of the trail.

Nos. 6 and 7 in line with the axletree of the limber.

No. 8 in line with the splinter bar (with 6 horses.)

The Nos. stand covering, one yard from the wheels.



IN FRONT.

Two deep 15 yards in front of the shafts, No. 2 covering right limber wheel, or horses' heads when mounted.

IN REAR.

Two deep two yards in rear of the muzzle of the gun, No. 3 covering right gun wheel.

RIGHT OR LEFT.

Two deep in line with the gun axletree, one yard to the right or left of the wheel.

MOUNTED.

No. 1 on his horse; 2 and 3 on the gun axle seats; 4 and 5 on the limber; 7 on the off lead and 6 on off centre horse—8 between 4 and 5; when only 4 horses are in draught, No. 6 sits on limber box between 4 and 5.

The gun is never accompanied by its wagon under fire.

DRILL. TO MOUNT.

PART I.

Officer.
Prepare to Mount.
Mount.

No. 1.
Prepare to Mount.
Mount.

"*Prepare to Mount.*"—Nos. 6 and 7 run to their horses, the other Nos. to their places; 2 and 3 to the gun axle seats, 4, 5, and 8 to the gun limber.*

The numbers that mount on the carriages seize the guard irons with their outward hands, and place their inward feet, 2 and 3 on the foot rest, which they pull out; 4 and 5 on the trail handles, No. 6 or 8, as the case may be, puts his right foot on the spoke of the wheel, and his right hand on the top of the wheel.

"*Mount.*"—The whole spring into their places, (the Nos. on the gun limbers facing to the rear, but turning round to the front, lifting their feet together, and throwing them over the guard irons,) when seated they lay hold of the hand straps with both hands, and sit upright.

Going over rough ground the centre man puts his arms through those of 4 and 5, who should lay hold of the guard irons with their outward hand, and slightly raise themselves from their seats to avoid being jolted.

"*Sit at Ease.*"—Drop the hand straps and sit well back, both hands remaining between the thighs.

TO DISMOUNT.

Officer.
Prepare to Dismount.
Dismount.

No. 1.
Prepare to Dismount.
Dismount.

"*Prepare to Dismount.*"—Nos. 2 and 3 drop the hand straps and place their inward hands on the gun, and their feet in front of the foot rests; 4 and 5 throw their legs over the guard irons, and turn to the rear, No. 6 or 8 stands up, his outward hand on the top of the wheel.

"*Dismount.*"—The whole jump off and form the order of march, but if for action they go to their posts at the gun. Nos. 1, 6 and 7 jump off their horses.

EXERCISE WITH DRAG ROPES.

When drag ropes are used Nos. 6 and 7 pass them towards 2 and 3,

* When 4 horses only are used, No. 6 goes on the limber box between 4 and 5, No. 7 rides off lead horse. 8 remains with the wagon in rear.

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PART I.

SEC. II.

DRILL.

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who hook them to the drag washers of the gun on their own side. The Nos. manning them on their own side. The highest number is in the shafts.

TO ADVANCE WITHOUT DRAG ROPES.

Nos. 2 and 3, between muzzle and wheel, push at the axletree boxes, 4 and 5 man the gun wheels, 6 and 7 the splinter bar, the highest number in the shafts.

CHANGE OF POSITION OF DETACHMENT.

To Form the Order of March from Detachment Rear.

Officer.

No. 1.

From the order of march.

Left turn, Double march.



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"*Left turn.*"—No. 1 turns with detachment, places himself at the head of rear rank, and gives the word "*double march.*" the whole step off together, No. 7 followed by front rank, wheels right about, and leads up on right side of gun; No. 1 followed by rear rank, leads up on left side. The Nos. halt at their posts, viz: 2 and 3 in line with axletree of gun carriage, 4 and 5 in line with centre of trail, 6 and 7 in line with axletree of limber, 8 in line with splinter bar, 1 in line with point of rear shaft, and two yards from it; the whole one yard clear of wheels, and covering from the front.

To form Detachment Rear from the Order of March.

Officer.

No. 1.

Detachment rear.

Right about turn, Double march, Halt, Front.

"*Right about turn.*"—The detachment turns about together; at "*double march.*" the whole step off, Nos. 2 and 3 incline inwards, till they arrive in front of muzzle; when about two yards in rear, they wheel to the left and mark time when covering right gun wheel, the remainder cover off; when the detachment is square, No. 1 gives "*Halt.*" "*Front.*" and takes his place on the left of front rank.

To Form Detachment Right or left from Detachment Rear.

Officer.
Detachment Right (or Left.)

No. 1.
Right (or Left) turn, Double
March, Front turn, Halt.



1 8 7 5 3
0 4 2

"Right (or Left) Turn."—The detachment turns accordingly and steps off together at "double march;" when one yard clear of wheels No. 1 gives "front turn," and when in line with axletree of gun carriage "halt."

To Form the Order of March from Detachment Right.

Officer.
Form the Order of March.

No. 1.
Left Turn, Double March.

"Left turn"—The detachment turns together, No. 1 heads the rear rank, then gives "double march;" No. 7, followed by front rank, leads up on the right side of gun; No. 1 followed by rear rank, leads round muzzle, and up on left side, the numbers halting at their posts.

To Form the Order of March from Detachment Left.

Officer.
Form the Order of March.

No. 1.
Left Turn, Double March,

"Left turn."—After turning No. 1 heads rear rank as before, and gives "double march," the detachment wheels left about, No. 7 followed by front rank, leads round by muzzle, and up on the right side, No. 1, followed by rear rank, leads up on the left side, stepping out till the numbers reach their posts on the opposite side; the numbers halt at their posts.

achment Rear.

o. 1.

left turn, Double
front turn, Halt.

achment turns ac-
"double march;"
o. 1 gives "front"
e of gun carriage

To Form Detachment Rear from Detachment Right or Left.

Officer.*Detachment Rear.*No. 1.

*Right about turn, Double march,
Right (or left) turn, Halt
Front.*

"Right About Turn"—The whole turn about, and at "Double march," step off; when 2 yards in rear of muzzle, No. 1 gives "right (or left) turn," and when crossing gun, "halt," "front."

To Form Detachment Front from the Order of March.

Officer.*Detachment Front.*No. 1.*Double march, Halt, Front.*

ent Right.

1.

Double March.

No. 1 heads the
d by front rank,
rear rank, leads
halting at their

No. 1 doubles out 15 yards in front of points of shafts, (if with horses, 2 yards in front of horses heads), and at the command "double march," the detachment steps off together; as soon as 6 clears points of shafts or horses' heads, he inclines towards 7, the other Nos. follow; when 6 and 7 arrive in line with No. 1, they wheel to the left and mark time when up to him; when the detachment is square, No. 1 gives "halt," "front."

To Form the Order of March from Detachment Front.

Officer.*Form the Order of March.*No. 1.*Right turn, Double March.*

ent Left.

1.
Double March,

as before, and
out, No. 7 fol-
up on the right
side, stepping
posite side; the

"Right Turn"—The detachment turns to the right, No. 1 places himself in rear of rear rank, and gives "double march," the detachment steps off, wheels to the right; the ranks open as they approach the shafts, and form on their respective sides, the numbers halt at their posts; No. 2 when he halts, raises his right hand and turns about, the other numbers take the time from 2, and come about with him. When there are several gun detachment, they all take the time from No. 2 of the right gun.

To Form Detachment Rear from Detachment Front.

Officer.

Detachment Rear.

No. 1.

*Right turn, Double March. Rear
turn, Right turn, Halt, Front.*

"*Right turn.*"—The detachment turns, No. 1 covers rear rank, and gives "*double march*;" when one yard clear of wheels, No. 1 gives "*rear turn*;" when two yards in rear of muzzle, "*right turn*," and when covering gun, "*halt*," "*front*;" taking his place on the left of front rank.

To Form Detachment Front from Detachment Rear.

Officer.

Detachment Front.

No. 1.

*Right turn, Double March,
Front turn, Left turn, Halt,
Front*

"*Right turn.*"—The whole turn together, No. 1 then gives "*double march*," and when one yard clear of wheels, "*front turn*;" when 15 yards in front of shafts, "*left turn*," and when covering gun, "*halt*," "*front*."

Changing Rounds when the Gun is Limbered Up.

No. 2 becomes 4; 4, 6; 6, 8 or 1; 1, 7; 7, 5; 5, 3; 3, 2

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should be
"*Lower*
carriage is

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ent Front.

Co. 1.

*Double March. Rear
turn, Halt, Front.*

ers rear rank, and
heels, No. 1 gives
"right turn," and
face on the left of

ent Rear.

Co. 1.

*Double March,
left turn, Halt.*

en gives "double
turn," when 15
ring gun, "halt,"

red Up.

MOUNTING AND DISMOUNTING FIELD ORDNANCE.

Guns of 8 cwt. can be mounted and dismounted by a detachment of 9; it facilitates the operation with heavier guns to have a few additional Nos.

When, from the length of the gun the trail cannot be raised sufficiently high to bring the gun perpendicular, and so clear the trunnion holes, a hole must be dug to receive the muzzle.

TO DISMOUNT GUN AND CARRIAGE.

OFFICER.

*Prepare to dismount gun and
carriage.
Dismount the gun.*

Dismount the carriage.

No. 1.

*Prepare to dismount the gun.
Dismount the gun.
Lower the trail.
Run back.
Lower the gun.*

*Dismount the carriage.
Lift.*

"*Prepare to dismount gun and carriage,*" No. 1 removes or turns down the elevating screw and removes tangent sights; 4 and 5 attach a drag rope to the cascable by an overhand knot in the centre, passing the ends to the front, 4 removes the sponges and drag shoe, 5 the handspikes, 4 and 5 then go to the trail ready to lift; 2 and 3 remove the cap-squares and man the wheels; 6 assists at the trail. No. 7 brings up a drag rope to 4, Nos. 1, 7, 8 and 9 place themselves in front of the gun and man the rope, No. 1 and 8 on the right, 7 and 9 on the left.

"*Dismount the gun,*" Nos. 4, 5, and 6 raise the trail, 2 and 3 man the wheel forward, until the gun is perpendicular.

When the muzzle touches the ground, Nos. 1, 7, 8 and 9 steady the gun on its muzzle, having hauled it out of the trunnion holes by the drag rope if necessary, and the carriage is run a few inches to the rear.

It is to be recollected, that after the gun is disengaged from the carriage, the weight of the trail is much increased, and the men should be prepared for this.

"*Lower the trail*" the trail is lowered; and at "*Run back*" the carriage is run back by Nos. 2, 3, 4, 5 and 6.

- Centre driver will act as No. 9.

PART I. SEC. II.

DRILL.

"Lower the gun" the drag rope is manned by all the Nos. on the own sides outside the ropes, and the gun is lowered by the Nos. walking forward with the drag rope.

So soon as the gun is lowered, all the Nos. take post on their own sides, No. 1 facing the breech, and 2 and 3 being nearest to the muzzle.

"Dismount the carriage," with carriages for guns over 9 cwt., Nos. 2, 3, 4 and 5 pass a handspike, brought up by 1, under the axletree on the side to be lowered, and lift; the wheel is moved by 6 and 8 or 9, and the carriage lowered on to the axletree. The other wheel is then removed in the same manner.

With carriages for guns of 9 cwt., or less, Nos. 2, 3, 4 and 5 lift the carriage, 2 and 3 in front, and 6, 8, 7 and 9 take off the wheels, 6 and 7 in front, 8 and 9 in rear, and at "Lift," the carriage is lowered to the ground, No. 1 assists to lift the breast of the carriage.

In both cases Nos. 8 and 9 attend to the linch pins and washers. The limbers and wagons are dismounted in the same way, the boxes and shafts having been previously removed by the detachment.

When necessary the stanchions on the axletree boxes must be removed.

TO MOUNT GUN AND CARRIAGE.

OFFICER.	No. 1.
<i>Mount gun and carriage.</i>	<i>Mount the carriage.</i>
	<i>Lift.</i>
	<i>Prepare to mount the gun.</i>
	<i>Lift.</i>
	<i>Run the carriage up.</i>
	<i>Raise the trail.</i>
	<i>Lower the trail.</i>

The operation of mounting a carriage is the converse of the above, as also that of the gun, with the following exceptions:—

In mounting guns above 9 cwt., Nos. 2 and 3 place a handspike in the bore and lift, whilst 4 and 5 place a handspike under the gun behind the trunnions to be manned by 2, 3, 4 and 5; 6 and 7 then place the muzzle handspike under the breech to be manned by 6, 7, 8 and 9, the whole of the Nos. facing the muzzle. Additional Nos. man a drag rope placed on the caseable by 4 and 5, as in dismounting, a turn being taken round the handspike with either end of the rope, the running ends coming off below; the detachment lifts the handspikes until it can more advantageously haul on the rope.

With guns under 9 cwt., Nos. 2, 3, 4 and 5 lift at a handspike under the gun, 4 and 5 having previously fixed drag rope on caseable, and No. 1 at the breech; 6, 7, 8 and 9 haul on the rope, placed as above, and when the gun is perpendicular Nos. 1, 7, 8 and 9 steady it.

* This shi occurred at a drill near the gun col General Sir

DRILL.

PART I. SEC. II.

TO REPLACE A DAMAGED WHEEL BY FULCRUM OR REDUCED NOS.*

OFFICER.

Right gun wheel disabled.
(Left) " "

No. 1.

Right gun wheel disabled.
(Left) " "
Scotch the sound wheel.
Raise the trail.
Lower the trail.
Change wheels.
Raise the trail.

"*Right gun wheel disabled.*"—No. 7 brings the spare swingletree (whimpletee) from the limber, hands it to No. 1 to use as a fulcrum, then doubles to the rear with 6, 7 and 8, to lift the spare wheel off the wagon perch, which must be unlimbered for the purpose; the centre or lead driver assists. As soon as the wheel is clear of the wagon, No. 7 runs it up to the gun, dish outwards, brings it opposite the damaged wheel and stands ready to assist in lifting it on, remaining in rear of the wheel.

"*Scotch the sound wheel.*"—Nos. 3 and 5 scotch the left wheel with trail handspikes or pieces of stone. If the ground is soft, 2 and 4 unhook the drag shoe, 2 places it under the end of the swingletree, which No. 1 places nearly perpendicular, the top leaning slightly to the rear as a fulcrum under the rear of the axle-tree bed, close to the damaged wheel.

"*Raise the trail.*"—Nos. 3, 4 and 5 raise the trail to enable No. 1 assisted by 4 to place the swingle-tree perpendicularly, as a fulcrum, with the end resting on the drag shoe, if the ground is soft.

"*Lower the trail.*"—The damaged wheel will be raised an inch or two from the ground. No. 1 removes linch pin and washer, and places himself in rear of damaged wheel to assist 6, who stands in front of it to lift it off. No. 2 stands in front of new wheel to assist in putting it on.

"*Change Wheels.*"—The old wheel is taken off by 1 and 6, the latter runs it to the rear; 2 and 7 put on the new wheel; 1 replaces linch pin and washer; 7 and 8 help 6 to put the damaged wheel on the wagon perch, assisted by a driver as before.

"*Raise the trail.*"—Nos. 3, 4 and 5 raise the trail, No. 1 releases the swingle-tree and lays it on the right of the trail, for 7 to take back to the limber after placing the wheel on the wagon perch. No. 2 replaces drag shoe, if used, 3 and 5 unscotch left wheel and replace handspikes, if used.

* This shift can be done when the detachment is reduced to 4, as occurred at Inkerman, a shell breaking the top of a wheel and disabling nearly the whole detachment; the wheel was changed and the gun continued in action. Lt.-Col. Wool commandeered General Sir David Wood, K. C. B.

The Nos. then fall into their places.
The left wheel is changed in a similar manner; 2 and 4, 3 and 5 working on their respective sides, 2 and 4 scotching right wheel, &c.

If the wheel is so broken as to let down the axletree, or no swingle-tree is available, nor anything suitable for a fulcrum is at hand, the wheel can be shifted as follows:—

TO REPLACE A DAMAGED WHEEL BY LIFTING.

OFFICER.

Right gun wheel disabled.
(Left) “ “ “

No. 1.

Right gun wheel disabled.
(Left) “ “ “
Lift.
Lower.

“*Right gun wheel disabled.*”—No. 1 removes the linchpin and washer, and places himself in rear of the right wheel, ready to lift it off the axletree. No. 4 takes the handspike, and passes one end of it from rear to front under the axletree to 2 and 3, who man it on that side. No. 5 double mans it on the side of 4. The whole place themselves with their backs towards the gun.

Nos. 6, 7, and 8 double to the rear, and lift the spare wheel from off the perch of the wagon. As soon as the wheel is clear of the wagon, No. 7 runs it up to the gun dish outwards, and when it is opposite the right wheel he halts and changes from the rear to the front of it, ready to assist in lifting it on. No. 6, as soon as the wheel is off the wagon, doubles up and places himself in front of the disabled wheel, ready to assist No. 1 in lifting it off. No. 8 places himself outside the left wheel.

“*Lift.*”—Nos. 2, 3, 4 and 5 lift at the handspike until the wheel is off the ground. No. 8 lays hold of the top of the left wheel, and uses his weight and strength in bearing the right wheel from off the ground. Nos. 1 and 6 lift off the wheel, which is immediately run to the rear by 6, and No. 1 shifts to the rear of the new wheel. Nos. 1 and 7 lift the new wheel on to the axletree, and as soon as it is on, No. 1 gives “*Lower.*” 2, 3, 4 and 5 withdraw the handspike, which 4 replaces. No. 1 puts on the washer and linchpin, and 6, 7 and 8 double to the rear and lift the disabled wheel on to the perch of the wagon.

The Nos. then fall into their proper places.

The left wheel, when disabled, is changed in a similar manner, except that the wheel is brought up on the left side of the gun instead of the right.

The Nos. at the handspike must raise the end of the axletree sufficiently high to throw the weight on the other wheel, and the wheel must be lifted and not slid along the axletree.

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LIFTING.

No. 1.

Wheel disabled.

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With guns above 9 cwt., a drag-rope brought up by No. 7 is made fast to the shoulder of the axletree of the disabled wheel, by 2 and passed over the other wheel to four Nos. of another gun detachment.

A shaft brought up by No. 8 and placed by 4 is manned by 2, 3, 4, 5, 8 and 9.

As the wheels of a light battery are all of the same nature, when a gun wheel is disabled in action, the wheel from the limber may be substituted for it, and the disabled wheel, if quite unserviceable, can be replaced as soon as another can be brought up. If the wheel be not quite unserviceable, it may be put on the limber till a convenient opportunity for exchanging it; and should it be necessary to move the carriage a short distance, the wheel may be locked with a drag chain, the sound part on the ground.

TO EXCHANGE THE GUN AND LIMBER WHEELS.

The preparations at the gun are the same as before. At the limber the horses are taken out; Nos. 2, 3, 4 and 5 come from the gun, and assist in lifting the limber; 6 and 7 take off the wheel, and the axletree is allowed to come gently to the ground.

Wagon wheels are removed in the same manner as those of the guns.

TO SHIFT SHAFTS FROM DOUBLE TO SINGLE DRAUGHT.

OFFICER,

Shift the shafts from double to single draught
Remove horses and prepare for single draught.

No. 1.

Shift the shafts from double to single draught.
Remove horses and prepare for single draught.

No. 1 takes the hammer from the gun carriage, and hands it to 8; 8 places himself on the outside of the near shaft, and with the hammer unbolts it and assisted by No. 1 shifts the rear shaft into the left loop, places the bolt through it, hands the hammer to 7, and holds up the near shaft.

No. 7 removes the linchpin from the off axletree arm, and also takes out the linchpin and removes the washer from the iron arm underneath the limber, and assisted by No. 1 disengages the off shaft and places it in the right centre loop, and on the iron arm underneath the limber where he also replaces the linch-pin; then replaces the washer and linch-pin on the off axletree arm, and keys up the off shaft underneath the limber, when No. 1 has shifted it.

The Nos. then resume their places, No. 1 replacing the hammer.

TO SHIFT SHAFTS FROM SINGLE TO DOUBLE DRAUGHT.

OFFICER.

*Shift the shafts from single to double draught.
Remove the horses and prepare for double draught.*

No. 1.

*Shift the shafts from single to double draught.
Remove the horses and prepare for double draught.*

No. 1 takes the hammer from the carriage, and hands it to 7; 8 supports the near shaft (standing outside of it), whilst the off one is being shifted; 7 places himself outside the on shaft, and unkeys it underneath the limber; and then takes out the linc-pin, and removes the washer of the off wheel.

No. 1 places himself between the shafts, and as soon as 7 has unkeyed the off shaft, he disengages it from the iron arm underneath the limber, withdraws it from the loop, and places it on the axletree arm; he then turns to the right about, and takes hold of the near shaft.

No. 7, as soon as No. 1 has adjusted the off shaft on the axletree arm, replaces the linc-pin in the latter; and then puts on the washer and linc-pin of the iron arm under the limber; he then hands the hammer to 8, and holds up the off shaft whilst the near one is being shifted.

No. 8 on receiving the hammer from 7, unbolts the near shaft; No. 1 shifts it to the left centre loop, where it is then bolted on by 8. The whole of the Nos. then resume their places, No. 1 replacing the hammer.

TO PUT ON THE DRAG SHOE.

"On drag shoe."—On a gun wheel, Nos. 2 and 4 or 3 and 5 unhook the shoe, and throw it as much as possible under the wheel; 2, or 3 buckles the strap round a felloe.

A wagon wheel is locked in a similar manner by two spare Nos. with the wagon.

"Off drag shoe."—The strap is unbuckled, Nos. 4 and 5 with a hammer knock down the top keepers, the chain runs out, and the wheel passes over the shoe. This operation must take place just before arriving at the bottom of the descent. The shoe is picked up by No. 2 or 3, and hung on the hook on the breast of the carriage or rear of the wagon. The shoe is generally very hot from friction.

TO MOVE DISABLED ORDNANCE.

1. GUN WITHOUT A WAGON; CARRIAGE DISABLED.

OFFICER.

Carriage disabled.

No. 1.

*Dismount the gun.
Sling the gun.
Dismount the carriage.
Prepare to lift the carriage.
Place the wheels and lash.*

"Dismount the gun."—As before detailed.

RAUGHT.

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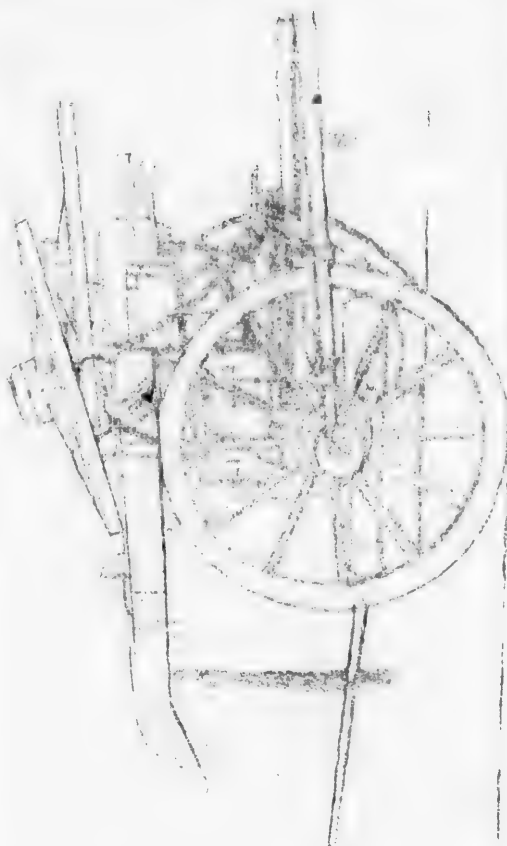
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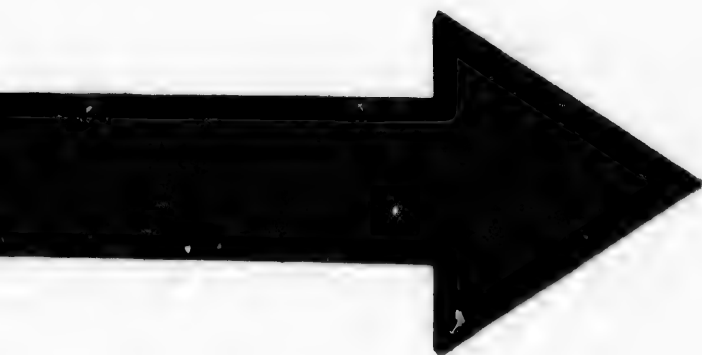
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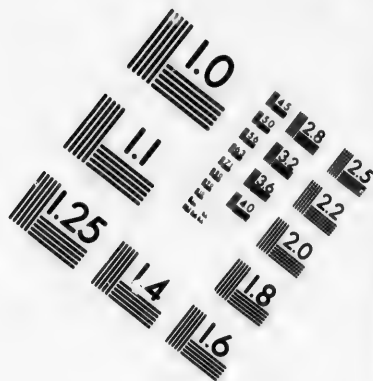
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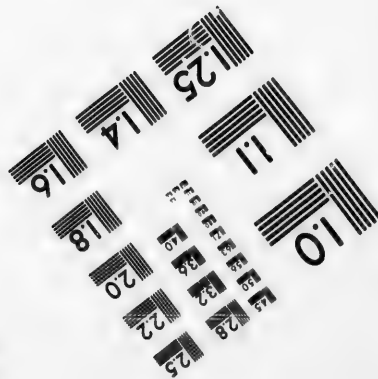








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"Sling the gun."—The limber is run over the gun so that the breech may be towards the shafts and the trunnions under the limber hook. Nos. 2 and 3 put a handspike in the muzzle and raise it; 1 and 5 sling the gun with a rope the returns are passed in rear of one trunnion and in front of the other, round the limber hook, and the end passed to the front to 6 and 7, who place a half hitch round the cascabe, then pass the end over the centre futevel in front of the footboard and make fast. If the wheelers are not known to be perfectly quiet, it is best to remove them and hook in again after the gun is slung.

Nos. 2 and 3 bear down the muzzle when the end is passed to the front, until the breech is secured. Nos. 8 and 9 hold up the shafts.

"Dismount the Carriage."—As before detailed, the capsquares are replaced and keyed by Nos. 2 and 3. The arms of axletree boxes have to be removed also.

The carriage is then turned over by the whole of the Nos. The limber is brought up in front of the carriage, the muzzle of the gun touching the breast.

"Prepare to lift the Carriage."—No. 1 places himself in the shafts, 2 and 3 lift at the trail, 4 and 5 the cheeks close to the axletree, 6 and 7 the axletree arms, 8 and 9 the breast.*

The carriage is lifted until the axletree arms touch the wheels, 8 and 9 mount on the top of the limber boxes, and lift again, until the breast of the carriage rests on the boxes. 8 and 9 step down on to the footboard and lift until the trunnion holes are about flush with the front of the boxes.

No. 1 sees that the weight is properly balanced for draught.

"Place the Wheels and lash."—Nos. 8 and 9 put on the linch-pins and washers. The Nos. on each side place the wheels on the top of the carriage dish down.

Nos. 2 and 3 secure the trail to a handspike in the muzzle, by the drag chain, 4 and 5 lash in rear to the box handles, 6, 7, 8 and 9 lash in front, 6 and 7 mounting on the footboard pass the breast chains (if there are any) over a felloe or spoke of each wheel, 8 and 9 hook a drag-rope to the chain on their respective sides and lash to the splinter bar. The side arms are strapped to the trail, one end resting on the limber boxes. It is not advisable to repeat this exercise very often, as the carriage and limber boxes are liable to be damaged, and for all practical purposes, it is best to carry away the carriage, by supplying a spare wheel, if necessary, and limbering it up as usual; if so damaged as not to be able to travel without the weight of the gun, it is probably not worth removing from the field.

* Where No. 9 is mentioned, a driver or gunner from the wagon is supposed to perform the duty.

2. GUN WITH A WAGON, CARRIAGE DISABLED.

OFFICER.

Carriage disabled.

No. 1.

*Dismount gun and carriage.**Prepare to lift.**Lift.**Place the wheels.**Dismount gun and Carriage.*—As before stated.

The wagon and gun carriage are so placed that the rear of the wagon will be close to and in front of the trail.

The carriage is then turned upside down.

"*Prepare to lift.*" Nos. 2 and 3 place themselves at the trail; 4 and 5 at the cheeks close to the axletree; 6 and 7 at the axletree arms; 8 and 9 at the breast. At "*Lift.*" the carriage is lifted, and the trail rested on the footboard; Nos. 2 and 3 then mount up and seize the trail handles, and at the next heave bring the trail on the rear box. Then lifting and moving forward, they bring the trail eye near to the limber boxes, but not to touch them. In this position the trunnion plates might injure the lids of the boxes, but by placing a piece of wood three or four inches thick on the boxes it will raise the carriage clear.

Nos. 2 and 3 fix the trail to the perch of the wagon with the drag chain, 6 and 7 lash to the futchels of the wagon,

"*Place the wheels.*"—The Nos. on each side place the wheels on the limber boxes dish up, and they are lashed to the box handles by Nos. 2, 3, 4 and 5.

The spare wheel will have to be removed (if there is one on the perch), it can be carried with the other on the limber.

3. GUN AXLETREE ARM BROKEN.

OFFICER.

Gun axletree arm disabled.

No. 1.

Gun axletree arm disabled.

If it is required to retain a gun in action whose axletree is disabled, a stout spar, or, that not being procurable, a spare perch or a couple of shafts being available, either can be secured to the gun carriage. The drag-shoe being placed underneath to prevent the spar or shafts sinking, and to lessen the friction if required to move.

"*Gun axletree arm disabled.*"—Nos. 2, 3, 4 and 5 take the spar (10 or 12 feet long) and pass it under the axletree bed, lashing it with drag ropes to the ring on the breast of the carriage under the gun, or by lashing to the cheeks of the carriage in front of the elevating screw. The remaining Nos. lifting the carriage on the side of the disabled axletree.

If it is necessary to move the gun any considerable distance, the mode given in page 71 should be adopted.

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DRILL.

PART I. SEC. II.

1. GUN CARRIAGE, ONE WHEEL PARTIALLY DISABLED.

Suppose one or two of the fellows are disabled, the disabled fellows are turned up, and the drag-shoe placed as for going down hill.
Should there be no shoe, the wheel can be lashed to the trail to prevent it revolving.

EXERCISE WITH DRAG ROPES.

When drag ropes are used the limber gunners pass them to 2 and 3, who hook them to the drag washers of the gun. The Nos. manning them on their own sides. No. 1 assists at the points of the shafts, 8 between them. To get a gun out of a difficulty or to assist the horses for a short pull, a wheel purchase is taken by 2 and 3, hooking round the lowest fellow in rear, and passing the rope along the tire, the Nos. haul evenly.

TO ADVANCE WITHOUT DRAG ROPES.

Nos. 2 and 3 between muzzle and wheel, push at the axletree boxes, 4 and 5 man the gun wheels, 6 and 7 the splinter bar, No. 1 assists at the points of the shafts, 8 between them.

The limber wheels should never be manned.

USE OF THE PROLONGE.

The prolonge is no longer issued to Field Batteries, the drag rope can be used in emergency, but the light drag ropes for Field Artillery are hardly strong enough. There are two prolonges in the service, heavy and light, they are made of two pieces of white (or manilla) rope joined by an oval link in the centre, one end has a cringle fitted into it with an eye splice, and the other a hook, the length of light prolonge is 8 feet; the heavy is 18 feet long, and made of 3 inch rope, the light of 2 1/2 inch rope. It should be carried strapped on the foot board of the limber with the drag ropes, when required it is fixed by the limber gunners, who pass the ring over the pintail hook and key up, the other end is made fast to the trail eye, if the hook is too large to go through, it is hooked into a bight of the rope, or the prolonge can be shortened by hooking into the eye.

The prolonge is generally applied when the Battery is retiring in action slowly before the enemy, as for instance part of a rear guard. When the rear of a column retires with the prolonge along a road, the cavalry usually in advance will hesitate to attack it, if its flanks be secured. Never retire precipitately even when urged to do so. The last few rounds of case shot may save your infantry comrades and bring success, when the case is expended and the enemy still pressing, use reversed shrapnel with the plug out or an unbored time fuze, No. 5 sits on the axletree seat to serve the vent, and avoid being run over in retiring, No. 4 sits on the box on his own side and fires avoiding similar danger as well as recoil, while 2 and 3 can serve the gun even in motion.

The gun being laid horizontal, little subsequent laying is required for case at close ranges.

Whenever a gun is ordered to reverse with prolonge, the limber must back a little, and then describe a small circle; No. 6 will be careful that the prolonge does not get under the wheels. Should a gun carriage and limber be capsized completely over, it might be advisable to right it by attaching the horses with prolonge to one side and capsizing the gun the way it overturned.

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DRILL.

PART I. SEC. II.

If the lower part of a gun wheel breaks and lets down the axletree, it will be found that the gun and carriage require a very heavy lift to raise them sufficiently to change the broken for a new wheel, the team of the gun may be employed to do it without unhooking, by simply unlimbering and fastening the prolonge to the pintail and around the axletree bed of the broken wheel.

In default of a drag chain, the prolonge may be used to lock the wheels, as in going down a hill, or in case of a gun in action on the reverse slope of a hill, the prolonge being fastened round a fellow close to a spoke of the wheel prevents excessive recoil.

It may also be used with advantage in moving disabled field ordnance to sling the gun on the limber hook, by the ring in the centre, but if the gun is to be carried any distance over stony ground or rough roads, it is best to knock off the drag chain and use it to sling the gun under the limber. It has also the advantage of not slacking by stretching as rope does. The prolonge is also useful in getting unlimbered guns over ditches or obstacles, when the guns cannot be driven over limbered up in the usual manner, they are unlimbered and the limber attached to the prolonge, which is again either hooked into the breast rings or trail eye according to circumstances.

The prolonge may also be used in crossing ammunition boxes over a river on the picket rope, the ring being used as a runner and the two ends used as slings.

SLEIGH DRILL.

Sleighs are used for the conveyance of Artillery, during the winter in Canada.

The Sleigh at present in use, consists of a platform, six feet ten inches long and three feet ten inches wide, placed upon runners sixteen inches high; upon this rest two strong transoms, to which the brackets supporting the gun are secured. A box, distinct from the ammunition boxes, is placed on each side of the gun, together they are capable of containing twelve rounds of ammunition, and serve as seats. These boxes contain also the necessary small stores.

The extreme breadth of the runners is three feet, which, though broader than the sleighs used by the *habitants* of Lower Canada, is not so broad as to prevent their travelling over any of the ordinary roads of the country. These sleighs are capable of conveying the summer carriages for a short distance; in case of emergency, they can also be carried upon the wheel carriages. The manner in which a gun, with its ammunition, is arranged upon the sleigh is as follows:—

Three sleighs form one subdivision.

On the first is mounted the gun with its sidearms. The front box of the wagon body and the gun limber boxes are carried on No. 1 ammunition sleigh. On No. 2 ammunition sleigh the rear boxes of the wagon body and the wagon limber are placed. The knapsacks and blankets are carried on the ammunition sleighs, the latter folded and strapped on the lids.

If the roads are good, two horses are sufficient for each sleigh, but four horses are usually put to the gun, and to each of the ammunition sleighs; this arrangement is only suitable for parades and exercises on good roads, as the gun is the lightest of the three sleighs which compose a subdivision.

When a Battery is on the march, the snow being deep, and the roads narrow, it will, generally speaking, be found most convenient to have the spare horses either in front or distributed between the subdivisions they are intended to assist; this is very necessary, on account of the impossibility of moving from the rear to the front. It is advisable to have the Infantry and dismounted gunners marching in front to tread the roads, and even to make them if necessary, by trampling, the leading party with snow shoes, a second without, to be followed by a third with snow shoes, to level the whole before the guns. In an enemy's country, of course, flankers and feelers on snow shoes will be necessary.

When descending a hill, the drivers should go straight down, however steep: the steeper and smoother the descent is, the greater the danger of the rear of the sleigh slewing round—when a sleigh slews in this manner, the horses should be thrown off to the side to

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which the sleigh is inclined to slew, and if this is not sufficient to check it immediately, they should be pulled up. The drag chain should be invariably used in going down steep places, when the roads are slippery.

When the road is narrow, it sometimes becomes necessary to put the horses into single draught, with two horses to each sleigh, the one remaining in the shafts, which are shifted to the centre of the sleigh. Long reins are buckled on and the horse driven from the sleigh. The near horse having each a pair of leading traces hooked on to their collars, are then hooked on in front of the shaft horses, the drivers remaining mounted. Should a third horse be required, and no other available, a mounted No. 1 with breast harness can be hooked in; the leading rein may be attached to the crupper ring of the leading horse.

It should be borne in mind that on service long reins would always be used. In the intense cold of a Canadian winter, a man cannot ride any length of time, though the ordinary system of driving does well enough on parade or in mild weather; in any case, during winter the stirrup leathers should be wrapped in blanket strips.

In Ontario and New Brunswick, the country sleighs are all constructed for double draught; in the Province of Quebec and Nova Scotia for single draught. In the neighborhood of towns where the roads are beaten and good, these differences may be disregarded, but in deeply grooved roads in the country, nothing but the system in vogue in that part of the country could be employed.

In the province of Ontario, where the snow is not generally deep and the tracks are double, and would perhaps admit of the gun axle being carried across the sleigh, a bob-sleigh might be improvised to carry the gun on its carriage and the lumber and wheels on the fore part, the two parts of the sleigh being connected by the trail eye and timber hook. This system would admit of a change to wheels if necessary.

HOOING IN.

The drivers hook in, gunners unhook.

POST OF DETACHMENT WITH SLEIGHS.

The position of a gun on a sleigh being reversed, (that is the muzzle to the front instead of the rear), it becomes necessary to alter the position of the detachment, that each man may find himself on his proper side of the gun when it is brought into action. The word of command from detachment rear being "right" turn instead of "left," as with wheel carriages.

The odd numbers or front rank, will be on the left or near side, the even numbers or rear rank on the right or off side; No. 1 on his horse, 2 and 3 in line with the muzzle, 4 and 5 in line with the breech, 6 and 7 one yard in rear of 4 and 5, 8 one yard in rear of 6.

PREPARE TO MOUNT—MOUNT.

No. 1 on his horse, 2, 3, 4 and 5 on the gun sleigh, 6 on the off lead horse, 7 and 8 on No. 1 and 2 ammunition sleighs. In consequence of the narrowness of the winter roads, it is found better that detachments when marching should usually do so in rear of their respective sleighs, but when the roads are soft they march in front to beat them.

COMING INTO ACTION.

No. 3 unhooks the swingletree, places it on the back of the near horse, hooking the swingletree in the crupper ring, point upwards, and then steps in and takes hold of the shafts on the near side and 2 on the off side, and the two numbers lift them off, laying them gently on the ground; No. 1 gives the word "drive on," when all is ready. In coming into action to the front or the right, the gun horses move to the left, and in action left, to the right and form in rear. As it is impossible to reverse in deep snow, it is best, when it is intended to come into action for ammunition sleighs to increase their distance.

It is conceived that with sleighs as at present constructed, the muzzle should be to the front in advancing, and to the rear in retiring, in which latter case, after the word "Battery will retire," the word "rear limber" would be executed by attaching the shafts to the rear of the sleighs. Should the commander wish to retire with the muzzle front, the word of command would be, "Rear limber up, muzzle front." The gun sleigh has to be slewed by hand.

On coming into action, if the gun does not point in the proper direction, it is brought round by the Nos. seizing the hooks on the front and rear of the sleigh, No. 1, 2 and 3 in front, and 4 and 5 in rear, assisted by 6, 7 and 8 if required. The recoil of guns on sleighs varies from 4 to 5 feet on rough ground or in deep snow, to 20 or 30 yards when on glare ice. But the recoil may be considerably lessened by placing the drag chain under each of the runners.

MARCHING ORDER.

In marching order the following tools are on the gun sleighs.

- 1 pr. long reins for driving when in single draught.
- 2 drag ropes.
- 1 spare swingletree.
- 2 swords on front of platform, under breast of gun.
- Claw hammer.
- Wrench and pincers.
- Blankets strapped on lids of ammunition boxes.
- 1 axe.
- 1 shovel.

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No. 1 AMMUNITION SLEIGH.

- 1 pr. long reins for driving.
- 2 drag ropes.
- 2 spare swingletrees.
- 1 sword on front part of platform.
- 2 rifles on front box.
- Spare sponge and worm on platform, right of boxes.
- Spare handspike on left side.
- 4 spare traces between front and rear boxes.
- 2 swords on platform in rear of boxes, covered by 4 knapsacks.
- Blankets strapped on lids of ammunition boxes.
- 1 shovel.
- 1 axe.

No. 2 AMMUNITION SLEIGH.

The knapsacks are strapped from off handle of off box, to near handle of near box.

- 1 pr. long reins for driving.
- Blankets strapped on lids of ammunition boxes.
- 1 Axe and 2 camp kettles on front of platform.
- 1 sword on front box.
- Pickaxe in rear of front box.
- 2 spades.
- 4 water buckets strapped to guard irons of front box, 2 to each side.
- 2 swords in rear of boxes covered by 4 knapsacks.

MOVEMENTS.

Filing from column into line, from line into column, and coming into action, may be said to be almost the only movements which would ever be required from a Battery on sleighs, but for the sake of exercise nearly all the movements which are made with wheel carriages may be made with sleighs when the snow is not deep.

NOTE.—In consequence of the muzzle of the gun being to the front when travelling, the snow from the horses' hoofs and from snow drifts is thrown into the bore, causing miss fires, and rendering it necessary to have a muzzle tampon, which should be attached by a cord to the platform, to avoid its being lost when not used. Likewise a fuze hole plug-key affixed to the rear of the right bracket, for the use of No. 1, when extracting the plug and fuzeing the shell.

FIELD ARTILLERY FOOT PARADE.

It is not desirable to have two kinds of foot drills in the Canadian Artillery *i. e.* Infantry for foot gunners, and Cavalry for dismounted drivers, as in the R. A., where men are enlisted for long periods of service; therefore the Infantry formation by fours—which gives sufficient room for files wearing spurs—will alone be used to move Artillery on foot parades without guns.

N. C. OFFICERS AND MEN SALUTING.

Soldiers will be practised in saluting, first by Numbers, then judging the Time; being turned to the right for the right-hand salute, to the left for the left-hand salute.

Caution,—*Right-hand Salute, by Numbers.*

- One. { On the word *One*, bring the right hand smartly, but with a circular motion, to the head, palm to the front, point of the forefinger one inch above the right eye, thumb close to the forefinger; elbow in line, and nearly square, with the shoulder; at the same time, slightly turn the head to the left.
- Two. { On the word *Two*, let the arm fall to the side, and turn the head to the front.

Caution,—*Right-hand Salute, judging the Time.*

- Right-hand Salute.* { On the word *Salute*, go through the two motions described in *One* and *Two*.

Soldiers will be taught to salute with the left hand in like manner. Soldiers, if standing still when an officer passes, will turn towards him, come to attention, and salute; if sitting, they will rise, stand at attention, and salute. When a soldier addresses an officer, he will salute, and halt two paces from him. When walking, soldiers will salute an officer as they pass him, commencing their salute four paces before they come up to him; they should therefore be practised in marching, two or three together, round the drill ground, saluting points placed on either side of them, care being taken that they always salute with the hand furthest from the point saluted; when several men are together, the man nearest that point will give the time.

Soldiers will invariably salute anybody they know to be an officer, whether he is in uniform or not.

A soldier, with his sword undrawn, passing an officer, always salutes with his right hand.

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GENERAL INSTRUCTIONS FOR DRIVERS.

GROOMING.

Pick and wash feet on coming in. Wash eyes, nostrils and dock. Begin at off hind-quarter, go towards the head, curry the dirt out, then brush it with a straight arm, with circular motion, against as well as with the grain, until perfectly clean; the hand not immediately in use to be kept on the horse, to prevent his closing on the groom. Carrycombs should not be much used on the horse except to take off the dirt.

After a march, when men arrive at stables, or encamp, they are first to take off bridles, tie up the horses by the head collar and ropes, loosen girths, turn up crupper and stirrups, wipe bits and stirrups. Then take head-collar off, turn the horse about, sponge nostrils and eyes, rub his head with a dry wisp, turn him about again, put on the head-collar, and give hay.

After an interval to refresh the men, saddles are taken off, horses fed, watered and bedded. The horse's blanket is used for his covering at night, with surcingle. Upon the vigour and exertion with which grooming is performed greatly depends the condition of the horse, especially under fatigue and exposure to weather. By hand-rubbing the legs and ears, not only until they are dry, but until the blood circulates freely, the health will be greatly preserved.

Immediately the saddles are removed, the men must be taught to examine the shoulders, withers, and docks, and be most particular in reporting the least tenderness, heat, swelling, or itching. Non-commissioned officers are to pay strict attention to this, and see that the pads and collars are often beaten to prevent knots in the skin.

FITTING SADDLES, BRIDLES AND HARNESS, &c.

Saddle is to be placed in the middle of the horse's back, the front of it about the breadth of a hand behind the play of the shoulder, paying particular attention that the tree does not touch the horse's backbone.

Stirrup.—The lower edge of the bar is to be two fingers above the upper edge of the heel of the boot for Gunners *i. e.* the leather and stirrup the length of the arm, fingers extended; one inch higher for Drivers.

Pannel should be so stuffed as to have an equal pressure on the sides of the horse's back, taking care not to pinch the sides of the wither, or touch the horse's backbone, leaving room enough to admit of two fingers being introduced, both in front and rear.

Numnah.—To be fastened on saddle, or pad, with its straps tightly buckled round the flaps of pannels, care to be taken that the numnah does not rest on the horse's withers, but is well raised into the fork of the saddle over the withers by putting the arm, or a

rolled horse rubber under it, which latter is withdrawn after the horse is girthed up.

Shoe Pockets.—Strap to be passed round cantle of saddle, or through ring of pad, point of buckle down, then passed through holes in shoe pocket, which is to be buckled on, with nail pocket outside.

Wallets to be placed on pommel of saddle or pad, with hollow side of connecting piece to the front; the wallet strap to be passed to the rear through front keeper on the wallet till edge of buckle touches the keeper, the point of the strap then to be passed through rear staple, next through rear keeper on back of wallet, then through front staple, and finally through front keeper on back of wallet, and buckled point to rear.

Crupper should admit the breadth of the hand between it and the horse's back, care being taken that none of the hair remains between it and the dock.

Girth, when buckled, to admit of a finger between it and the horse.

Surcingle to lie flat over and not tighter than the girth.

Head-collar to be so fitted that there should be room for two fingers between the horse's nose and the nose-band, which should be the same distance below the cheek bone.

Throat-lash to admit the breadth of three fingers between it and the horse's jaw.

*Head-rope when carried.**—Non-commissioned officers and gunners: round neck of horse, the roll of extra rope to have four turns, and to be six inches from lower ring of jowl piece. Drivers: seven turns of rope, to commence six inches from lower ring of jowl piece, passing through outer ring of hames (over side rein and under bearing rein of off horse), through wither buckle from the top, lying over outer bar and tongue; is knotted inside at proper length, wither strap buckled over it.

Head-stall of all bridles to be of such a length that the mouth-piece of the bit may be one inch above the tusches of geldings, and two inches above the corner teeth of mares.

Leading-rein.—The short piece on near side, should be carefully fitted, so that the bearing of the bit in the horse's mouth be even.

Bearing-rein, buckled to cheek of bit, and should not be tight, especially in going up hill; it might, with advantage, be generally dispensed with.

Side-rein buckled to cheek of bit, below bearing rein; should not be tight, and might often be advantageously dispensed with, especially when the off horse is mounted.

Curb-chain to be flat and smooth under the jaw, sufficiently loose to admit of one finger when the cheeks of the bit are in a line with the head-stall.

* Head-collar chains are still used by Canadian Artillery, who sometimes hitch their horses to fence rails, or fasten the picket ropes to the carriages. They do not use heel ropes, which are thought unnecessary, and to which horses would not become accustomed, during the short period of training.

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Bridle-rein to be of such length as to allow the upper part of the driver's left arm to hang straight from the shoulder, the lower part to be at right angles with the upper, and the rein full in hand when at attention on horseback.

Collar.—The collar is to be fitted so as to admit of the flat of the hand between the horse's throat, at the lower end, and the fingers between collar and neck at the side; a short collar is apt to choke a horse, and a broad collar to work about and gall him; a narrow collar rubs his neck, a broad one his shoulder.

Hames should be bent at the bottom, so as to fit the lower part of the collar, and from about three inches below the draft-hooks, straight to nearly the top, where they should turn a little out. The breast-chain should be so hooked that the hame-strap, when buckled, will keep the draft-hook at a proper height.

Wither-strap should not be tight, or otherwise it would pull the saddle forward, and tighten the crupper.

Belly-band, buckled so that it will hang the breadth of a hand or more below the horse's belly when in draft.

Bearing and Hip-straps should be fitted so as to keep the traces on the same line.

Breeching.—The trace being of such a length as to allow 18 inches space between the horse's quarters and splinter-bar, the breeching should be fitted to allow of his falling back 4 inches, *i. e.*, 4 inches play; it will leave 14 inches margin for limits of error, projection of eyes on splinter-bar, &c., which is not too much. The breeching should hang 10 or 12 inches below the dock.

Back-band to be of such a length that the points of the shafts are above the line of draft, and high enough to leave only a slight weight on the horse's back; this question is but little affected by the mounting of the men, for their weight comes nearly over the axletree, if the shafts are pointed slightly upwards. There should be sufficient preponderance of weight on the horse's back to prevent the shafts at any time swinging up, so that the belly-band catches the horse underneath; for example, in going up hill.

Traces.—Their length must in a great measure depend on the size of the horses and the nature of the ground; the distance should not be less than one yard from nose to croup. It may be well to consider the condition of six horses in a team, deducting that of eight or four from it.

Fig. 1 shows the general position of the line of trace along the team, and it may be noticed that each part is common to all the horses in front of it; that is, that all the horses in front are pulling through it except the links which branch off and lead to the shoulder-hook of the horse's hame.

Thus the lead, centre, and wheel horses all pull along the trace AB, the lead and centre pull through BC, and the lead only through DC. The question naturally arises, ought not AB to be three times as strong, and BC twice as strong as CD? and no doubt if special traces were made for each team it might be well to have it so; but as the same harness is used throughout the service it would be difficult to carry this out, and in practice it is not found that wheel

traces break oftener than lead, rather the reverse, because the shaft horse is constrained to be steady in draft, not so the lead.

With a team of six, however, or even eight, good service traces stand well enough, and officers need not therefore generally consider the strain that comes on them.

Inclination of Trace. The height of the splinter-bar to which the wheel-trace is hooked, is about 2 feet 10 inches from the ground, while that of the shoulder of the hame is from 4 feet 3 inches to 4 feet 8 inches. It is therefore obvious that the trace will incline upwards to the front, for the pull of each horse tends to draw the trace straight to his own shoulder-hook; thus the wheel horse, if uninterfered with, would pull it in the line AE, the centre horse in the line AF, and the lead AG. If the lead animal was about 25 hands high, (say a giraffe), and the wheel-horse fifteen, and the centre an intermediate height, perhaps all these lines might coincide, or if the splinter-bar was much higher than it is, it might be brought to do so. No doubt this, theoretically, would simplify matters, and cause all the team to pull truly in the same direction; practically, it is only possible to adjust the draught so as to cause the least waste of force, and this is done by placing the higher horse in front of the lower throughout the team, as far as is consistent with having a powerful pair of compact horses in the wheel, especially the shaft horse.

In fact, then, the horses pull slightly against each other, and when all are working equally the trace AB takes a direction influenced by the pull of all; BC by that of the two front horses, and CD is drawn direct towards the lead horse's shoulder. This is represented by the thick line ABCD in the figure.

If the lead horse is out of his collar, the hinderpart of the trace rises to a position considerably higher, and if the wheel-horse only, is working, his trace takes the position of the straight line AE.

It follows, therefore, that should the bearing straps, hip straps, or bellybands interfere with the trace taking either of these directions, they may more or less distress the horses. The first position is the one that is supposed to be generally the one assumed, but it will be seen hereafter that in the case of wheeling, the horses have to be taken out of their collars in succession as they turn the corner, and hence at the moment of turning, the wheel-horse only works. On account, then, of this and numerous other occurrences, it is well to fit the harness so as to admit of its taking all the above positions.

The harness of each horse, then, must, to a certain extent, be fitted by guess, and corrected by observation when at work, in what way, is best judged by riding or walking at some little distance from a team, and observing whether the traces may be stretched direct to each horse's shoulder in succession without interference, while on the other hand no straps are very loose, except the wheel-horse's bellyband.

Dropping links and length of traces. As to length, it will be found that the service traces are not too long for horses moving at a gallop, or moving over rough ground. It is therefore better never to cut lead traces short; two or three links may be dropped with small lead, or centre horses, but in the wheel trace not more than

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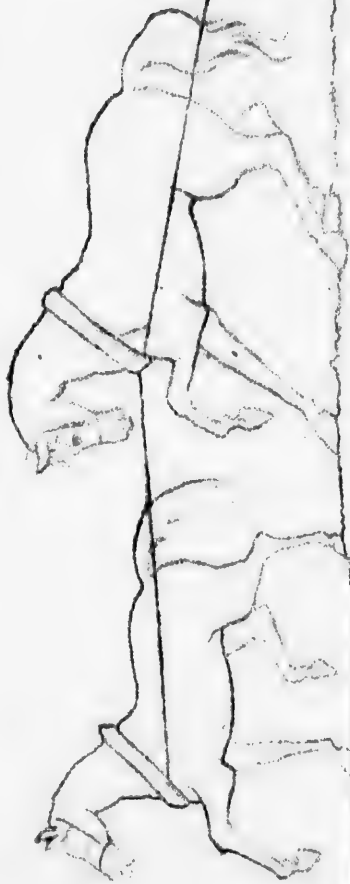
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one or two links should be dropped, as it may be seen that the trace passes very low down on the wheel-horse, and it might therefore be lifted out of its proper line at his shoulder and so distress him if there were not sufficient links, for these links are the only means provided to enable the trace to take the line in which the horses naturally draw it. Fig. 2 shows a large wheel-horse and small leader, and yet it may be seen that when the wheeler is out of the collar the trace is able to lead direct to the shoulder of the leader, so that the wheel-horse leaning in the collar only feels the effect due to his own pull, applied in rather a wasteful way it is true, but entirely different from the evil that might be caused by a bad system of draught such as that shown in Fig. 3, where the pull of the leader tends to drag down the leader whether he is in or out of the collar.

There is no great harm in shortening wheel traces where it seems necessary, as is commonly the case.

It is generally thought workmanlike to see wheel-horses well back in the shafts; shortening the trace in this way gives, theoretically, a slight advantage, the shafts also are less likely to be broken, but for the same cause (viz., the decreased length of lever) the horse would have rather less power to keep the shafts steady over very rough ground. Sufficient room must be left behind the horses to allow of their being thrown right back in the breaching without their quarters running any risk of striking the splinter-bar, as before stated.

BREAST HARNESS.

Breast Harness. Breast Harness should be fitted to rest across that part of the horse's chest and shoulders which has least motion, that is high up, but at the same time not so high as to rub or interfere with his neck and throat.

It will be found that this will indicate a position approximate to that shown in Fig. 4. It will generally be necessary to have the breast straps fitted loose, even when not in draught.

A horse, especially with a man on his back (whose mere weight adds to the horse's power,) can perform a good deal of powerful draught with breast harness, and it is, therefore, good for the purpose for which it is designed, viz., to enable a mounted man to hook in and assist a carriage when it is in difficulties. It fits any horse when properly adjusted, and it is light to carry, compared with collar harness.

The latter requires to fit the horse, but if it fits can hardly be put on wrong; while the breast harness may be said to fit any horse equally, but it can hardly be put on right. It is a great advantage when horses get collar-galled on the march to exchange them to breast harness, and *vice versa*, especially in the case of volunteer Artillery, whose collars cannot be altered to suit the inevitable change of a large proportion of horses that takes place at each training.

The Fig. 5. represents a shaft-horse, in marching order; the forage



Head Collar.

- a. Cheek pieces.
- b. Jowl piece.
- c. Throat lash.
- d. Head piece.
- e. Nose band.
- f. Brow band.

Harness Bridle.

- g. Bridle head.
- h. Bearing rein.
- i. Side rein.
- k. Leading rein.

Harness Bit.

- l. Cheeks.
- m. Bottom bar.
- n. Leading rein loops.
- o. Curb chain and hook

Driver's Kit.

- q. Valise.
- r. Baggage or Valise straps.

Pad or Off-Saddle.

- p. Sheepskin.
- s. Numnah.
- t. Pommel, bearing hook, and wither straps.
- u. Cantle.
- v. Flaps.

- w. Girth & surcingle.
- x. Flank straps.
- y. Hip straps.
- z. Crupper.
- A. Staple of crupper.
- B. Harness collar.
- C. Hame strap.
- D. Hames.
- E. Buckling piece of wither strap.
- F. Shoulder bar and hook.
- G. Breast chain and hame hook.
- H. Wallets.
- J. Forage cord.

Traces.

- I. Pipe or case.
- K. Trace links.
- L. Trace hooks.
- M. Belly band.
- N. Buckling piece of flank strap.

Breeching.

- O. Buckling piece of hip strap.
- Q. Body piece.
- R. Shaft strap.
- S. Belly band of tug.
- T. Tug & back band.

N. B.—Water bottle and forage cord on active service.

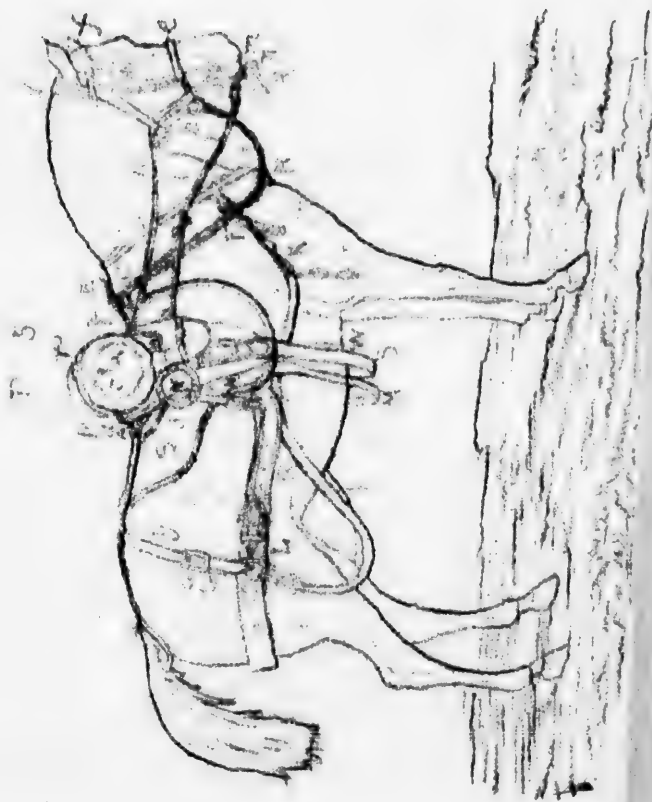
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INSTRUCTIONS FOR PUTTING UP HARNESS AND HORSE APPOINTMENTS IN THE HARNESS-ROOMS.

Harness.

Nose-bags.—One on each peg, hung as far back as possible.

Heel Ropes and Picket Pegs.—Rolled ready for marching order and hung with nosebag of off set on peg as far back as possible. (Not used in Canada.)

Collar.—Hung on peg, with hames buckled, point down.

Traces.—D on the hames-hook, the links to hang loose, other end hooked to hames-link.

Saddle or Pad.—Hung by crupper, surcingle buckled as when on the horse, ends of the hip straps passed through the hame-hooks.

Belly-band.—Buckled round traces and crupper; the traces hanging double, straight down inside the saddle or pad.

T-bits.—Rolled, as for marching order, and hung on the bearing-rein hook.

Bridle and Head Collar.—As if on the horse's head, reins loose hanging over the front part of the saddle or pad, curb over bit.

Head Rope and Collar Chain.—On head collar ring, ready for parade, end hanging down.

Breeching.—Over the collar.

Girth.—On saddle or pad, buckled as on horse.

Numnah.—Folded double, laid on the top of all.

Legging.—Hung to near hame-hook of riding set by top strap buckled; other straps unbuckled ready to be put on.

Whip.—Hung by hand loop to off hame-hook of hand set.

Non-commissioned Officers' Appointments.

Nosebag, Heel Rope and Picket Peg.—(The two latter not issued).—Fastened together by a "tie," and hung on the peg, as far back as possible.

Traces.—The centre of breast-piece is placed on the saddle peg close up to the post or wall, trace to be laid at full length, two hooks at each end, then fold in three equal parts. One buckling piece to be round each end of trace when folded. The loin strap to be passed round the traces and buckled to loin strap buckles.

The loin strap to remain round the traces when hung up; the saddle hooks to be hooked into D's of breast harness, under the saddle.

Bridle and Head Collar.—Hung up complete, with head rope or chain as when on the horse's head, the bridoon in front of bit, twisted bit head piece over all, curb hooked over front of bits.

Saddle.—Is next put on the peg, surcingle and girth to be buckled as on the horse, crupper hanging down with end inside noseband; the stirrups to hang at riding length inside noseband of head collar.

Numnah.—Folded double, laid on top of all.

DISPOSAL OF HARNESS IN CAMP.

It is always desirable to put harness in spare tents, if procurable. Harness and saddlery to be laid down in rear of line of horses.

Traces.—To be laid on the ground doubled (lead traces twice doubled, with the whole of the links to the same side.

Legging.—Passed round links of traces, with centre of strap buckled.

Collars. with harness complete, crossways on traces, lining of collars downward, points of collars reversed.

Breechings doubled inside collars.

Pad complete on collars, with crupper thrown over top of pad.

Saddle complete, on top of pad, with crupper thrown over top of saddle, stirrup irons run up, leathers clear of ground.

Bridles hung on pommel of saddle, bits clear of ground.

Whip, hung on pommel of saddle, thong passed over head-piece of bridle.

T-bits, across seat of saddle ready for use.

Numnahs reversed one over the other, inside face downward on top of the whole.

Nosebags on top of numnahs ready for use.

Non-commissioned Officers' Appointments.

Saddle complete on ground resting on pommel, stirrup irons and crupper looped on cantle.

Breast Harness.—Breast piece across horns of saddle.

Bridle.—Head-piece of bit hung on cantle over saddle seat, bridoon over bit.

Numnah covering seat of saddle, inside face next seat.

Nosebag on top of numnah ready for use.

HARNESSING.

First Method.

When the whole of the harness is not buckled together—Buckle end of the suringle to the tabs of the saddle on the off side. The side of the girth; a knot is tied on the girth and suringle to keep them clear of the ground.

The lead drive commences with the off horse. The horse having been put on the short rack, at the word "*Harness*," clear the saddle, which has already had the numnah fitted to it, from the other parts of the harness, support it on the left arm, and with the cantle towards the elbow, place the crupper over the seat of the saddle, holding the end in the right hand which also assists to support the pommel of the saddle, place the saddle on the horse's back from the off side, cast off the knot of girth and suringle, and place the crupper on the horse's loins; move to the near quarter of the horse, gather the hair of the tail in the right hand, and put on the

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crupper with the left, clear the dock hair from the crupper, move forward on the near side, lift the saddle clear of the horse's back, move it forward towards the withers, and replace it on the centre of the horse's back, buckle the girth and surcingle, taking care that the surcingle be not tighter than the girth. Unbuckle the top strap of the collar, place the collar on the horse's neck, peak down, and buckle the top strap. Fit the hames and reeve the strap, so that when buckled the spare end shall fall to the inward side of the horse; turn the collar at the smaller part of the neck with the mane. Buckle the wither strap. Take the draught links of the off trace in the right hand, the trace-hook in the left, rest the bight of the trace on the left arm below the elbow. Hook the third link from the end to the shoulder hook and put in the tie. Buckle the bearing and hip-straps, pass the trace hook up inside of the hip-strap, and outside of bearing strap, and hook it to the draught-link at the shoulder; put on the near trace in the same way, buckle the belly-band.

Turn the horse left about, and put on the bridle.

Place the centre of the riding horse's rein over the neck, the centre buckle towards the off side; buckle the billets to the bit.

The bearing (or off horse's) rein is placed over the neck, the centre buckle to the near side; the billets of the bearing rein are passed through, and buckled to those loops of the bit in line with the mouth-piece; the throat-lash of an off horse is buckled outside the bearing-rein.

The curbs are then put on.

The billet of the side-rein is passed through and buckled to the same loop as the off end of and under bearing-rein. The leading rein is buckled to the centre or lower loops of bit, as may best suit the horse's mouth, short piece or near side.

Wheel driver commencing at the off horse in the same manner as the lead driver, only that the hip-straps are not buckled to the traces. The breeching is to be put on before the traces, commencing at the off side. In putting on the traces, pass the bearing strap through the double of the shaft strap, to keep the latter in its place; pass the end of the near side of near wheeler's breeching inside the surcingle, and hook it into the ring of the hames at the near shoulder, and secure the hook with a leather thong.

Second Method.

When the whole of the harness is buckled and fastened together, At the word "*Harness*," turn the horse to the left about, pass the left arm through the crupper, take hold of the collar with both hands (one on each side), put on the collar, turn it round on the off side, and the horse at the same time to the left about, place the saddle on the horse's back, straighten the girth and surcingle, put on the crupper, buckle the girth, surcingle, and belly-band, put on the bridle, hook on the curb, and buckle the throat-lash, (if an off horse,) outside the bearing-rein and buckle the side rein.

Blankets.

On active service it is advisable to leave the nummahs in store and to carry a blanket carefully folded without creases, under the saddles and pads, to put on the horse in cold weather, care being taken that the surcingle does not gaff if a padded surcingle is not at hand, a whip of hay on each side of the back bone relieves pressure.

The men's blankets are carried strapped on the seats of axle and limber boxes.

Carrying a feed.

Nose bags when carrying a feed, should be strapped on the ring near the cantle of the saddle, near side of riding horse, off side of off horse.

HOOKING IN.

May be done by the gun detachments and the drivers, or by either.

*First Method.**By the Detachments and Drivers.*

"To hook in—prepare to dismount." "Dismount"—(see page 95.)
"Hook in."

No. 1 stands at the shaft horse's head; 7 assist lead driver, on off side, 6 assist centre driver on off side, 4 and 5 assist wheel driver, 4 on near side, 5 on off; 2 and 3 steady the limber and square it if necessary.

4 hooks near trace of riding wheeler, and then goes to his head; 5 raises off shaft and guides the point of it through the tug; the wheel driver acts in like manner with the near shaft, and gives the word "Ready," as a signal for No. 1 to back the shaft horse into his place, 5 will then hook the off trace and buckle the breeching; the wheel driver hooks traces, and buckles both breechings inside, the then stands to his horses.

Lead driver hooks near trace of riding leader and then goes to his head; 7 hooks off trace of off leader and then goes to his head; the lead driver hooks both inside traces, and stands to his horses.

6 and centre driver stand to their horses, the gun numbers will fall in.

In unhooking, the words will be—"To unhook," "Prepare to dismount," "Dismount," "Unhook,"—when each number and driver does what he had done in hooking in, commencing where he left off; as soon as the leaders are unhooked they must be moved forward to enable the shaft horse to be led clear of the shafts.

The traces should always be hooked before breechings are buckled, and in unhooking the breechings must be first undone.

The backs of the trace hooks are always to be down, and the points of the ties are to be inwards on the trace, but outwards on the shoulder hooks.

*Second Method.**By the Gun Detachment's.*

The drivers being mounted, at the word "*Hook in,*" Nos. 2, 3, 4, 5, 6 and 7 go to the horses. No. 3 takes hold of the shaft horse, close to the bit, with the left hand, right hand on the tug; No. 5 standing on the off side, raises the shaft, and gives the word "*Ready*"; 3 then backs the horse, each number guiding the tugs upon the shafts, they then hook the traces and buckle the breeching; 3 then hooks in the off trace of the near wheeler, then buckles the breeching over the trace, and passing out by the rear, hooks in the near trace; 6 hooks in the off centre horse, commencing with the off trace, then turning inside, and hooking near trace; 7 hooks in the lead horses in the same manner; with only four horses, 2 can assist to hook in the near wheeler.

8, 9 and supernumeraries hook in wagon horses when used.

*Third Method.**By the Drivers.*

The drivers being dismounted, at the word "*Hook in,*" take off their gloves and place them in the off wallet of riding horse, turn to the right and tie their leading to the riding reins by two half nitches; the lead driver doubles round by the front to the off shaft; the centre driver to the off side of his off horse; the wheel driver stands in between his horses' heads, taking hold of the bearing rein with his left hand, close to the bit, the right hand on the tug. The lead driver raises the shaft, and gives the word "*Ready*"; the wheel driver then backs the shaft horse, both drivers guiding the tugs upon the shafts; then hook the traces, and buckle the breeching; the wheel driver then hooks in the near wheeler, and the lead and centre drivers hook in their own horses as previously detailed for the detachment; the lead driver stands in front, takes hold of the bit of each horse, stretches the traces, and places the horses square with the carriage, the whole of the drivers putting them well on their legs, and stand to their horses as before.

FOUR HORSES ABREAST.

When teams of 12 horses four abreast are used with double shafts, the drivers of the off pairs ride on the off horses, and wear the leg-gings on their left legs, the near breeching strap with hook is fastened on off side of breeching of off riding wheel horse, near side of breeching fastened to D's on off shaft with a strong strap with keeper (this strap should be about 2 feet long and 2 inches wide), the side reins of the horses driven from the off side are fastened on the near side of their pads; all the inside horses are coupled together by a side rein fastened to the head collars to prevent them from flying outwards.

EQUITATION.

INTRODUCTORY REMARKS.

A very large proportion of the horses used in the Canadian Militia are the property of the men who for the most part know how to ride. It is therefore not necessary to detail the system of equitation laid down in the British Army, nor does the short period of training allow its being carried out. But every field battery can have a proportion of its officers, N.-C. officers and men, taught at the gunnery schools, and these can be employed in giving to their comrades the amount of instruction absolutely indispensable to the military horseman in order that being able to govern his horse by the aid of his legs and bridle hand, he may have the right hand at full liberty for the use of his weapons, and be capable on all occasions, whether acting singly or with the battery, of performing with ease his various duties.

When the drivers are mounted without guns for exercise or other purpose, they will be moved as cavalry, *i. e.*, form sections, half sections, files right or left.

See definitions page 41.

OPEN MANEGE.

It is desirable occasionally that all Artillery should be exercised in Open Manège, to prepare their horses for working steadily in the field, and to make the men trust only to the proper application of the Aids.

These Manèges may be formed in camp, by preparing certain portions of ground.

The length of each Manège should be sixty yards, the breadth twenty.

Where a larger size is required, and the ground will allow, an increase of five yards in breadth is to be made for every ten in length; one Manège will thus contain two good circles or longes.

The corners of the Manèges may be marked by large stones or stakes of sufficient height; and the same attention must be paid to making the corners square, as in the riding school.

By increasing the number of these Manèges, and placing them near each other, one or two Instructors in each, any number of men and horses may be worked under the superintendence of the Commanding Officer or Chief Instructor.

It is recommended that those Non-commissioned Officers and men who have been formed at the Riding Establishments of the Gunnery Schools, and of whom a favorable report has been made, should be frequently employed in conducting Riding Drills, in order that they may keep up their knowledge of the system.

PREPARATORY INSTRUCTIONS.

When the Recruit shall have been practiced in the elementary exercises of Marching, Turning, &c., on foot, and shall have attained a knowledge of the usual military terms and commands, they will commence their lessons in riding.

They may be instructed in squads of 12 or 14, on steady horses with stripped saddles and bridloons.

Their lessons at first must be short, and at all times gentle. With patience and mild treatment on the part of the Instructor, and with a proper explanation of the use and object of the different Aids, they will make more progress than by harshness and severity.

Recruits are to be taught to saddle and bridle their horses properly, and also the proper manner of leading them.

SADDLING WHEN NOT IN DRAUGHT.

Saddle, stirrup, girth, etc., as before described, page 81.

Breast-plate.—The upper edge of the rosette, or leather, three fingers above the sharp breast-bone. The breadth of the hand between it and the flat of the shoulder.

Breast-harness should hang horizontally from the slings, about 3 inches above the point of the shoulder, and should admit the breadth of the hand between it and the horse's breast.

BRIDLING A HORSE NOT IN DRAUGHT.

Head collar and curb as before, see page 82.

Bridloon is to touch the corners of the mouth, but low enough not to wrinkle them.

Bit is to be placed in the horse's mouth, so that the mouth-piece be one inch above the lower tusk, and two inches above the corner tooth, in mares.

LEADING THE HORSE.

The reins of the bridloon being taken over the head, are to be held with the right hand, the fore finger between them, near the rings of the bridloon; the spate end of the reins are then to be placed over the right hand.

When leading through a doorway, the man placing himself in front of his horse, and taking one rein in each hand, close to the rings of the bridloon, steps backward: taking care that the horse's hips and appointments clear the posts of the door. When the horse is through, he places himself on the near side, as before.

In passing an officer the man will march at attention, and look towards him, keeping his horse's head as high as his own breast.

The squad having led their horses into the riding-school or manege, and formed in line, at open files, each man standing on the near side of his horse, toes in a line with the horse's forefeet, will receive the word.

Reins over.—The reins are brought over the horse's head, and placed upon his neck, the man taking hold of the bridoon rein near the ring of the bridoon.

Stand at Ease.—The right arm is passed through the bridoon rein, both hands brought together in front of the body, right foot drawn back six inches and left knee bent. When wearing swg. Is, the left hand is placed on the hilt of the sword.

Attention.—The position of the man as at foot drill, but holding the left bridoon rein near the ring of the bridoon, with the right hand raised as high as the man's shoulder; to a in a line with the horse's fore-feet, left hand hanging down by the thigh. When with the sword, the sword is brought perpendicular by the side, with the left hand extended downward, fingers behind, and thumb in front of it; the shoe of the scabbard should be in front of the heel of the boot.

In front of your Horses.—A full step forward with the right foot turning to the right-about, on the ball of it, taking the bridoon reins in each hand near the rings of the bit, raising the horse's head to the height of the man's shoulder, six inches from his breast, and making the horse stand even. In this position a man shows a horse to an Officer when halted. In leading horses for inspection the horses are to be turned to the right-about.

Dress.—When fronting the horses, dress to the left, if the right would be the flank dressed to when mounted, and vice versa.

Stand to your Horses.—A full step forward, with the right foot to the horse's near side, and turn left-about on the ball of it. Standing to the off side is only done when off side is mentioned, the man steps in with his left foot, and turns right-about, and in fronting again, he steps out with his left foot, turning left-about.

MOUNTING WITH STIRRUPS.

Prepare to Mount. [In Four Motions.] *One.*—Turn to the right on the left heel, place the right foot opposite the stirrup, parallel to the side of the horse; heels six inches apart; take the bridoon reins equally divided in the left hand, and the bit reins in the right hand, placing the little finger of the left between them (the bridoon is to be taken in the same manner as the bit reins when used singly), place the left hand below the right on the neck of the horse, about two inches from the saddle.

Two.—The right hand draws the reins through the left, and shortens them, so that the left has a light and equal feeling of both reins, in the horse's mouth; the right hand remaining over the left.

Three.—The right hand throws the end of the reins to the off side, takes a lock of the mane, brings it through the left hand, and twists it round the left thumb; the left hand closes firmly on the mane and reins, the right hand now quits the mane, and lays hold of the left stirrup leather, with the fingers to the rear.

Four.—The left foot is raised, and put into the stirrup, as far as the ball of it; the right hand is placed on the cantle, and the left fence against the saddle, on the sure-ingle; the left heel is to be drawn back, in order to avoid touching the horse's side with the toe.

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Mount. [In Three Motions.] *One.*—By a spring of the right foot from the lunge, rise in the stirrup; bring both heels together; knees firm against the saddle; heels drawn back a little, the body erect, and partly supported by the right hand.

Two.—The right hand moves from the cantle to the pommel, and supports the body while the right leg passes clear over the horse's quarters to the off side; the right knee closes on the saddle, and the body comes gently into it.

Three.—The left hand quits the mane, and the right the pommel, the bridle hand takes its proper position; the right hand drops by the thigh, without stiffness, the back of the hand outwards, fingers half closed.

The right foot takes the stirrup, without the help of hand or eye. When the squad is to Dismount, the command is given—

Prepare to Dismount.—If in close order, the even numbers rein back one horse's length; dress to the right; the whole then proceed with the preparatory motions.

Prepare to Dismount. [In Three Motions.] *One.*—The right hand takes the rein above the left; the right foot quits the stirrup.

Two. The right hand holding the rein, the left slides forward upon it, about twelve inches from the saddle, feeling the horse's mouth very lightly.

Three.—The right hand drops the end of the reins to the off side, takes a look of the mane, brings it through the left hand, and twists it round the thumb, the fingers of the left hand closing firmly on the mane and reins; the right hand is then placed on the pommel; the body erect.

Dismount. [In Four Motions.] *One.*—Supporting the body with the right hand and left foot, the right leg is brought gently (without touching either the horse's hind quarters or the saddle) to the near side; heels close; the right hand on the cantle, to preserve the balance of the body as in mounting.

Two.—The body is gently lowered, until the right toe touches the ground.

Three.—Resting on the right foot, the left stirrup is quitted, and the left foot is placed in a line with the horse's fore-feet; the hands remain as in the former motion.

Four.—Both hands quit their hold; the man turns to the left on the left heel, and brings the body square to the front. During the turn, the right hand lays hold of the bridoon rein near the ring of the bit, and raises the horse's head as high as the man's shoulder.

TO MOUNT ON THE OFF SIDE.

Mounting and dismounting on the off side has to be practiced by the gunners on the off horses. It is the converse of the above; gunners do not wear swords.

Officers and mounted N. C. Officers, when compelled to mount on the off side, throw the sword well behind the left leg after rising in the stirrup; when mounted, the sword to be brought to the near side.

TO DISMOUNT, OFF SIDE.

The converse of dismounting on near side when the sword is worn, it is to be passed behind the man's back to the off side.

MOUNTING AND DISMOUNTING WITHOUT STIRRUPS.

This is sometimes necessary in coming into action, and with a restive horse and is the safest plan for an active man.

Without Stirrups—Prepare to Mount.—Turn to the right, step six inches to the right, and close the left heel; the reins in the full of the left hand, on the pommel, the right hand on the cantle.

Mount.—Bend both knees, spring from the insteps, by which the body is raised to the centre of the saddle, rather leaning over it; by a second spring of the arms raise the body till the arms are straight. Carry the leg over the horse, and fall lightly into the saddle, the right hand being carried from the cantle to the pommel, the left hand then assume their proper position.

Without Stirrups—Prepare to Dismount.—Quit the stirrups if in use, both hands, holding the reins, are placed with the fingers and thumbs extended on the pommel.

Dismount.—Raise the body out of the saddle by both arms, leaning forward, bring the right leg clear over the croup to the near side, and alight on the ground, the weight thrown on the toes.

The right hand lays hold of the bridle rein as before. The Recruits being mounted, and having been taught to take up the stirrups and to fasten them in front of the saddle over the horse's neck, by putting the off stirrup through the near stirrup leather, will be placed in the position without stirrups.

POSITION MOUNTED—WITH REIN IN EACH HAND.

The body balanced in the middle of the saddle; head erect and square to the front; shoulders well thrown back; chest advanced; small of the back slightly bent forward; upper part of the arms hanging straight down from the shoulder; elbows bent and lightly closed to the hips; little fingers on a level with the elbows; wrists rounded, throwing the knuckles to the front, and thumbs pointing inwards across the body; each hand holding a rein, between the third and fourth finger, the end thrown over the forefinger and the thumb closed on it, the hands about three inches from the body, and varying from four to six inches apart.

The thigh well stretched down from the hip; the flat of the thigh to the saddle; knees a little bent, legs hanging straight down from the knee and near the horse's sides; heels well stretched down, the toes raised from the insteps, and as near the horse's sides as the heels.

A plummet line from the front point of the shoulder should fall an inch behind the heel.

This is the position halted, or at a walk; at a trot the body must be inclined a little back, the whole figure pliant, and accompanying the movements of the horse.

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The position with stirrups is the same as without, the heels well stretched down and lower than the toes. The foot kept in its place by the play of the ankle and instep, the stirrup being under the ball of the foot.

Much.—In moving forward, the hands are to be eased by turning the little fingers towards the head of the horse; when in motion the hands resume their position.

Halt.—A steady feeling of both reins, by bringing the little fingers towards the breast, nails turned upwards; both legs closed for a moment, to keep the horse up to the hand; hands eased as soon as halted.

Sit at Ease.—Drop both hands with the backs up on front part of saddle, fingers extended; palms of hands on saddle; reins retained between forefinger and thumb of each hand.

Make much of your horses.—If riding on the left rein, both reins are taken in that hand, and with right, pats of encouragement are given on the horse's neck; if riding on the right rein, the left hand is used to caress the horse's neck.

If the command "*sit at ease*" is followed by the word "*sit easy*," the men may move their limbs, but must not lose their dressing. On the word "*eyes front*" being given to men "*sitting easy*," they will at once assume the position of "*sit at ease*."

Attention.—The position described in the two first paragraphs must at once be resumed.

Rein Back.—A light feeling of both reins; little fingers towards the breast, and pressure of both legs to raise the fore-hand, and keep the haunches under the horse; ease the reins after every step, and feel them again. This should seldom or never be practiced on the circle.

To take the horse into the corners, the outward rein must be felt and the inward leg applied, still preserving the bend.

"*Right or Left Turn*."—A double feeling of the inward rein, the outward retaining a steady feeling.

The horse kept up to the hand, by a pressure of both legs, the outward leg the strongest, to keep the haunches from being thrown out.

"*Right or Left About*."—A double feeling of the inward rein, and stronger pressure of the inward leg, supported by the outward leg and rein, the horse turning on his centre.

N.B.—By a turn about, the dressing is changed.

In turning to the right or right-about, the little finger of the right hand is to work towards the right shoulder; in turning left or left-about, the left little finger towards the left shoulder, upwards in both cases, to raise the fore-hand.*

* A horse, thoroughly trained in a military manege, can be manœuvred by a turn of the wrist and a pressure of the leg, but ninety-nine horsemen out of a hundred, habitually move their horses by carrying their hand towards the side to which they wish to turn. The pressure of the reins against one side of the horse's neck will turn him from it, though most people think they turn their horses to the right by pulling the right rein, and *vice versa*, as in a riding

In working to the right, the thumb of the inward (right) hand to be on a level with the little finger of the left; the inward rein one inch shorter, so as to let the rider see the horse's inward eye, and *vice versa*.

The squad halted by the wall or side of the manege, in file; "*Bend your Horses*," play lightly with the inward rein. The bend should be from the poll of the neck. Bending and unbending should be gradual.

The motion of the inward hand in bending, or forming a horse's mouth, should be by turning the little finger towards the body, nails upwards, and resuming the position, alternately, by a movement of the wrist, not by easing and drawing back the hand by a motion of the elbow, which must be kept steady.

It must be well explained that lightness of hand consists in an almost imperceptible feeling and alternat easing of the bridle, according to the motion of the horse, by which the delicacy of the horse's mouth is preserved.

POSITION OF BRIDLE HAND, WITH THE BIT.

The upper part of the arm hanging straight down from the shoulder, the left elbow lightly touching the hip; the lower part of the arm square to the upper; little finger on a level with the elbow; wrist rounded outward; the back of the hand to a level with the elbow, pointing across the body. The hand opposite the centre of the body, and three inches from it. The bridle rein when working with the bit to be held in the full of the bridle hand, and apart from the bit reins. The top of the thumb firmly closed on the bit reins, which are divided by the little finger. The right hand drops by the thigh without stiffness, the back of the hand outwards, fingers half closed.

DRESSING.

Dress.—The Flank Man, and the man next to him, being placed with their horses square, in line with the marker, with one yard between them, the remainder take up the Dressing in succession from the Flank to which the Dressing is ordered, each keeping the same interval.

Bodies to be quite square to the front; heads well up, and just turned enough to allow a glance of the eye towards the dressing point, so as to see only the surface of the face of the next file but one.

A correct position must be retained while dressing, whether halted, or moving; and no attempt must be made to catch the dressing, by leaning forward, or back.

school, when riding with a single rein in each hand. Few horses in Canada have a light mouth, from the fact that it is too cold to ride for pleasure in winter, they are therefore, driven in sleighs, and taught to bear on the bit in trotting fast; while in the country the driver commonly stands up, and leans the greater part of the weight on the bit. The proper aids have, however, been detailed for those who may have young horses to train as chargers.

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THE SWORD.

Officers, mounted N. C. officers, drivers, and occasionally gunners, for guard and picket duties, are armed with swords, but the gun is *par excellence* the weapon of the gannet, to which he is bound to be loyal to the last, and not to leave it for any other weapon of mere self-defence; nevertheless, gunners, like other soldiers, are liable to find themselves in a hand to hand encounter a *Parade blanche*. At Inkerman, the Royal gunners, though overwhelmed, faced the Russian bayonets with rammers, and even fists, and so died in defence of their beloved guns, which were not eventually lost; and there were instances in the Sepoy war, of mounted Royal Artillery having charged as cavalry, and even captured the enemy's guns. While in the fatal Kyber, the Bengal Horse Artillery having fired their last shot in covering the retreat of the doomed host, unhooked their horses and charged and recharged, till the last red plume went down.* In the Peninsula, Norman Ramsay's battery of R. H. Artillery, being cut off by the French heavy Cavalry (cuirassiers) charged and broke through them. It behoves an Artillery man, therefore, who has the honor of wearing a sword to know something of its use. There are but two modern swords of any practical use, the Taiwar of the East, and the Rapier of the West.† The first is a hard steel blade that takes a keen edge, which is never blunted in its leathern sheath; its handle is flat, and fits exactly to the grip of the small sinewy hand of the oriental that wields it. Its shape is such that the knuckles keep always the line of the edge, which is thus always leading, and the centre of percussion also leads, from the curved shape of the blade, which is, however, unsuited for parry or point, rendered still more difficult of delivery from the necessity of keeping the grip for cutting purposes—indeed the heel of the hand could not be slid round an Eastern hilt which, unlike the rapier, generally has a round plate at the end of the hilt, to assist still further the grip. The cuts of this weapon would seem impossible except to a Homeric hero, delivered as they generally are, with a straight arm, and the momentum of the horse rather than the muscular effort of the swordsman. Nevertheless, a cool English horseman will generally kill his man if he keeps him on the sword-arm side, rides straight, and simply receives on his sword or gauntlet, the first cut of his assailant and then drops his point quickly in the act of passing, never circling, as his horse is not sufficiently bitted to do so. Hodson was thought by his wild troopers to be a charmed life until his fatal bullet reached its billet, for though no swordsman, his assailant invariably fell.

* Kayes war in Afghanistan.

† The Japanese two handed sword need not be considered, it is unapplicable to a horseman.

Canadian swordsmen are not likely to meet oriental antagonists on this continent, and Col. Denison shows that the American Civil war produced no sabreurs such as are the product of long trained armies. The object, then, of the above explanation is to impress on the Canadian Artillery Militia, that though the short periods of training devoted to more important objects may not admit of their becoming perfect with the weapon they wear, or even learning the sword exercise as laid down; they need have no lack of confidence that the weapon will do its work if held straight. The English Cavalry sword is not suited for cutting, the handle is too large and round for the grip of an ordinary man, who would scarcely cut through a stout great coat, while the constant drawing from a steel scabbard renders the retention of an edge impossible; it will however guard a heavy blow, and pass through the body of an opponent if riding at speed, without any effort on the part of the swordsman. Mounted troops employed in civil disturbances should be careful never to give point; striking strongly with the flat will, however, occasionally break the sword. For the reasons given the details of Cavalry sword exercise, to be found in the Cavalry manual are not included in this work, except the drawing, saluting, and return.

The greatest attention should however, at all times be paid to maintain the proper position and balance of the body, which may be lost by too great an exertion in delivering a cut or thrust; the sway of the body should be supported by the pressure of the opposite leg against the saddle, the lower down the grip can be taken the better, provided the spur does not touch.

Officers and N. C. officers are, strongly recommended to neglect no opportunity of learning fencing with foils, which gives a wonderful quickness to hand and eye, as well as that confidence in his guard, which every swordsman should have, without trusting to avoid the attack of an opponent by turning or drawing back.

There is not time to learn the system of getting a squad of men to go through the exercise, guards and cuts, simultaneously by fugle-men, which is generally acquired by teaching men to check cuts, so as to be in a certain position for the next in rotation as laid down in the book, but seldom required in practice. The cuts are, however, an excellent exercise to develop the muscles; if practiced, they should be delivered in such a direction as not to strike the horse, but given freely with a straight arm, a tight grip and a true edge; the sound of the sword will tell when the edge leads. More effective than a hacking cut is the drawing of the edge, which can very frequently be applied with advantage, particularly when the point, by being given too soon, may not have taken effect, then by a quick turn of the wrist, the edge is drawn along the face or throat of your opponent, or any bare part which more immediately comes in contact with it as you pass at speed. The forcing also of the edge can be resorted to when very near and closely pressed upon by an adversary, by suddenly extending the arm, and directing the edge across the face, or where an

* "Men who smote with the edge of the sword" is the expressive term used in scripture for veteran soldiers.

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opening is given; in this case, however, the hand should not be carried more than absolutely requisite either to the right or left, or make too wide a movement, so as to offer an equal chance to your opponent. When too close to use point or edge, a blow with the hilt or pommel may be given with effect.

PREPARATORY SWORD DRILL ON FOOT.

The squad will be formed up at open files *Standing at ease*, the sword hanging by the sling, the palm of the left hand resting on the sword hilt, the right arm hanging by the side, the right foot drawn back six inches, the left knee bent.

Attention.—The sword to be brought upright by the side, the bottom of the scabbard resting on the ground, in front of the heel of the boot, the left arm extended, the hand round the scabbard, thumb in front, fingers in rear.

March.—Raise the sword smartly with the left hand, at the first pace, without stooping or disturbing the position of the body, placing the forefinger below the lower ring of the scabbard, the thumb and remaining fingers round it, the hilt touching the back part of the arm.

Halt.—Lower the scabbard to the ground, as in the position of *attention*.

Draw Swords.—Raise the scabbard about six inches from the ground, with the forefinger under the top ring, the hilt slightly thrown forward, bringing the right arm at the same time, smartly across the body to the sword knot, placing it on the wrist, and giving the hand a couple of turns inward to make it fast, and as the handle is grasped, turn the hilt to the rear, and raise the hand the height of the elbow, the arm being close to the body; by a second motion draw the sword from the scabbard with an extended arm, the edge being to the rear, and sink the hand until the hilt is on a level with the chin, the blade perpendicular, the edge to the left, and elbow close to the body, which forms the position of *Recover Swords*; then by a third motion bring the sword smartly down until the hilt is on a line with the elbow, the arm close to the body, blade perpendicular, the edge slightly inclined to the left, which forms the position of *Carry Swords*; at the same time bring the scabbard to the side, in the same position as directed for *Attention*, before drawing swords.

Slope Swords.—Loosen the grasp of the handle, and let the back of the sword fall lightly on the shoulder.

Stand at Ease.—Keeping the sword at the *Slope*, resume in other respects the position of *Stand at Ease* before drawing swords, the right foot drawn back six inches, the left knee bent, the palm of the left hand resting on the top of the scabbard. This position of standing at ease is always to be adopted on foot with swords drawn, both in the ranks and at open files.

Attention.—Come smartly to the position of *Slope Swords*, with the scabbard upright by the left side.

Carry Swords.—By a motion of the wrist and fingers, resume the grasp of the handle, so as to bring the blade upright, as before.

Return Swords.—Carry the hilt to the hollow of the left shoulder, the blade being kept perpendicular, and the back of the hand to the front, then by a quick turn of the wrist, drop the point into the scabbard, and resume the first motion in *Draw Swords*; by a second motion let the sword fall smoothly from the hand, at the same time loosening the sword knot from the wrist; by a last motion come smartly to the position of *Attention*.

In marching with swords drawn, the scabbard is to be raised on the word *March*, and lowered to the ground on the word *Halt*, in the same manner as described for marching with swords not drawn.

The recruit having been perfectly instructed in drawing and retarding his sword, will now be made acquainted with the strong and weak points of it; the *Fort* (strong) being the half of the blade near the hilt, the *Peeble* (weak), the half towards the point; indeed, a knowledge of these distinctions is very material, either in giving or guarding a cut; as much depends upon their proper application. From the hilt upwards, in opposing the blade of an adversary, the strength of the defence decreases in proportion, as the cut is received towards the point; and *vice versa*, it increases from the point downwards. The same grasp of the sword is to be retained throughout.

DISMISSING A BATTERY OFF PARADE.

Right turn, Dismiss.—After returning swords, *Right turn, Dismiss.* The whole turn to the right; the front rank break off to the left, the rear rank to the right. The men must always quit the parade ground without noise. In turning in a guard or picket the same mode is to be observed.

THE SWORD WHEN MOUNTED.

Horses unaccustomed to the sword must be treated very gently and gradually familiarized with its use by the rider, who should never use it to strike his horse, nor use a riding whip, which will make a horse shy when the sword is raised, mistaking it for a whip. The sword should be slung with the front sling so short that the hilt will hang close to the stripe on the left thigh—in this position the bridle arm below the elbow catches the sling and holds it down if the sword is still in drawing from the scabbard, the latter does not fly about if slung short and passed through the loop of the sabretache, as it will with a long sling. In returning the sword, if the edge is turned outwards, the blade comes across the mouth of the scabbard and steadies it to facilitate sheathing; while the forearm of the rider guides the back of the blade to the sheath, the handle is then turned in the right direction to allow the blade to drop home. It is dangerous to have the sword too loose in the sheath when mounted, as if jerked out in leaping, it falls on the hilt, which is heavy and presents the point to the horses breast or belly, as he descends from the leap. The sabretache (which should contain a map of the coun-

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turn, *Dismiss*. to the left, the parade ground me mode is to

d very gently r, who should p, which will t for a whip. t that the hilt s position the it down if the r does not fly abretache, as edge is turned senbboard and a of the rider s then turned . It is danger- ounted, as it vy and pre- scends from of the coun-

try with roads marked,) is worn with the front sling shorter than the rest. In walking the sword slings may be any convenient length. These seem small details, but few things make a man look more foolish than not being able to return his sword, and men are apt not to respect an officer who looks awkward on parade, no matter what his talents may be.

Draw Swords.—As before directed; except that the left hand holding the reins, does not quit its position to grasp the scabbard, which is prevented from rising (in the act of drawing,) by the left elbow catching the front sling, (as before described) the scabbard, after the sword is drawn, is left hanging by the sling.

Carry Swords.—The right elbow to touch the hip slightly; the wrist rounded so as to incline the edge slightly to the left; sword hand to rest on the thigh, the little finger in rear of the hilt.

Proving.—When proving the telling off with drawn swords at the slope, the sword hand is raised and extended straight to the front, the blade of the sword remaining on the shoulder with the edge up.

Slope Swords.—By bringing the lower part of the arms square with the upper, and by bending the wrist upwards, and relaxing the 3rd and 4th fingers, the sword is allowed to fall back on the shoulder.

Sit at Ease.—The sword hand is lowered and allowed to rest on the off-wallet, the bridle hand is dropped on the front part of the saddle.

Make much of your horses.—The blade of the sword near the fort is slipped between fore finger and thumb of bridle hand, back of blade to the left, and so held with the reins, while the right hand is used to pat and caress the horse's neck.

Sit Easy.—If the command *Sit at Ease* is followed by the word—*Sit Easy*, the sword blade will be lowered and placed between the fore-finger and thumb of the left hand, edge to the front, the right hand resting on the thigh, the men will then be permitted to move their limbs, but must not loose their dressing.

Eyes front.—On the words *Eyes front* being given to men sitting easy, every soldier will at once assume the position of *Sit at ease*.

Attention.—The position of slope swords is resumed by raising the sword blade, bringing the lower part of the arm square with the upper, the back of the sword on the shoulder. The bridle hand is raised to proper position.

When *Draw Swords* is ordered at the walk, the men remain at *Curry Swords* till ordered to *Slope*; when at the *Trot* or *Canter*, they come to *Slope* directly.

RULES FOR MARKERS.

When an officer or markers take up points for formation they draw swords; if marking for line, the hilt of the sword is to be held close to the right cheek, edge to the front; if for column the sword is to be at the *Recover*. On receiving the word *Steady* from the officer or sergeant-major dressing the points, they return swords. In advancing in line, the directing officer extends his sword or sword arm to the front.

The "*Carry Swords*," when on foot is to be the same as above. On the march (except when on the passing line in marching past,) or when manœuvring, the sword is to be at the slope, both on foot and when mounted.

When the sword is at the "*Carry*," mounted, (as in parade movements and on complimentary occasions,) the position is with the hilt resting on the right thigh, the blade perpendicular, the wrist rounded so as to incline the edge slightly to the left, the grasp of the lower fingers slightly relaxed.

In "*Slow time*" the salute on the march is to commence when at ten paces from the reviewing officer, taking the time from the officer on the right. The sword is then raised, by extending the arm to the right, and by a circular motion brought to the "*Recover*"; continuing the motion to the right shoulder, from whence the sword is lowered to the full extent of the arm, edge to the left, point about 10 inches from the ground. The time for completing the salute on foot, is four paces, commencing with the left foot, and may be divided (for drill practice,) as follows:—First pace, the sword raised to the right; second pace, to the "*Recover*"; third pace, to the right shoulder; fourth pace, the sword lowered to the right. The same time is given for the salute when mounted, but the sword should then be held at the full extent of the arm, in a line with the knee, edge to the left, the thumb extended on the hilt. On the march, the above four motions, are slowly combined into one graceful movement.

In "*Quick time*," the officers salute as follows: at ten paces from the reviewing officer, as the left foot comes to the ground, the sword will be lowered to the saluting position. The head should be slightly turned towards the reviewing officer while passing him, and having done so six paces "*Recover swords*," at one pace, and "*Carry*," on the following pace.

SWORD ARM SIGNALS.

It may sometimes be advantageous to use the following signals, which can be made with the sword or arm:—

1. *March*.—Sword and arm extended horizontally in the direction intended.
2. *Right or Left take Ground or incline*.—Sword and arm extended horizontally, hand in line with the shoulder, in the required direction.
3. *Right or Left Wheel*.—Sword and arm extended horizontally, then swept round a quarter circle in the required direction.
4. *Reverse*.—Sword and arm extended upwards, and circled round the head.
5. *Action*.—To indicate a position for action, or to be occupied, awaiting further orders:—arm and sword raised perpendicularly, and then lowered point to the ground; body well bent down.
6. *Halt*.—Sword and arm perpendicularly raised over the head.

The officer making the above signals must face to the proper front of the force, and they should be made distinctly, holding the sword in the required position for several seconds, with the flat turned as most visible, subalterns officers to repeat signals, except for action.

OF SIGHTS AND SOUNDS.

The horses must be gradually accustomed to the drawing and returning of swords, and firing, both mounted and dismounted.

The horse, being naturally afraid of these things, must not have his terror added to by harsh treatment. Patience, and gentleness being used, and the horse finding that these sights and sounds do him no injury, and are not accompanied by chastisement, he soon becomes familiarized with them, and sees and hears them without alarm. One minute's loss of temper, or violence, in the rider, may throw the horse back for a long time.

In all practice with arms, at first, suddenness of movement should be avoided, and every thing be done smoothly and quietly. The morning and mid-day gun should be made the signal for a feed of corn, to be followed by the trumpet sound; the horses soon learn to like both.

LEAPING.

When the instructor considers the ride sufficiently advanced for the purpose, "leaping" should be, occasionally, practised at the end of the lesson; two or three times is sufficient for a lesson.

The instructor will, of course, use his judgment so as to avoid irritating the horses or making unskilled men nervous.

During the lesson he will occasionally order *Halt*, and *Sit at Ease*, or *Dismount*.

At first the young horse should be led over the bar lying on the ground till he passes over it without alarm.

The bar may then be raised by degrees, and he will, by encouragement, learn to leap coolly in hand, from two to three feet in height.

If impatient in going up to the bar, he should be halted, reined back, halted, and tried again, till he leaps coolly; if allowed to hurry or rush, he will become an uncertain and unsafe leaper.

For the "Standing Leap," bring the horse up to the bar at an animated walk, halt him with a light hand on his haunches; as he rises, feel the reins only enough to prevent their becoming slack; when the horse springs yield them entirely; when the hind feet come to the ground collect the horse again, resuming the usual position and moving on at the same pace; the body is to be inclined forward as the horse rises, and backward as he alights.

For the "Flying Leap" the horse must not be hurried or allowed to rush; but his head must be kept steadily and straight to the bar, with a light hand; position the same as in the Standing Leap.

In leaping the snaffle or, as it is termed, the bridoon rein will be used.

Checking the horse after he has made the leap must be particularly avoided, as the horse takes it as a punishment, when he ought to be encouraged, and becomes shy of the bar the next time.

When time and opportunity offers the men and horses may be practised in leaping fences and ditches, for doing which the above

Instructions are equally applicable; but great care and judgment are necessary to avoid accidents, and not to urge men or horses to efforts for which their previous experience has not fitted them.

DRIVERS FILING IN AND OUT OF STABLES.

In filing into or turning out of stables the driver takes hold of the riding horse's bridle, close to the bit, with the left hand, whip in his legging, stock upwards. He takes hold of the leading rein with the right hand, and throws the off horse to the rear of the riding one, keeping hold of both horses until formed on parade, or put back again into the stable.

MOUNTING WITH HARNESS BRIDLES.

At the word *Prepare to Mount*,—

First Motion.—Turn to the right, and place the right foot about six inches to the right; with the right hand place the middle of the riding-rein and the leading rein over the palm of the left hand.

Mounting.—As before described, whip inserted in legging. When seated the left hand quits the mane, the bridle and leading rein are both retained in the full of the hand, and are tightly held between forefinger and thumb, the hand being raised as high as the elbow, the back of the hand inclined upwards, the right hand takes the whip out of the legging, and holding stock and thong, rests on right thigh, back of the hand up, both elbows close to the side; the right foot placed in the stirrup-iron, without the aid of hand or eyes.

SIT AT EASE.

On the command *Sit at Ease*, the left hand is dropped on the front part of the saddle, the right hand holding stock and thong of whip, remains resting on right thigh, back of the hand up. If the command *Sit at Ease* is followed by *Sit Easy*, the drivers will be permitted to move their limbs, but must not lose their dressing. On the word *Eyes Front* being given to men sitting easy, every driver will at once assume the position of *Sit at Ease*.

DISMOUNTING WITH HARNESS BRIDLES.

At the word *Prepare to Dismount*,—

First Motion.—Place the whip in the legging; the right foot quits the stirrup.

Second Motion.—As before described.

At the word *Dismount*,—As before.

STAND AT EASE.

The right arm (the right hand retaining the leading rein) is passed through the bridle rein, both hands brought together in front of the body, right foot drawn back six inches, and left knee bent.

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DRILL.

PART I. SEC. II.

Stand Easy.—Drivers fasten their leading reins to their bridle reins, pass round to the off side of their horses, and cast off the bearing reins. Wheel drivers lower the props.

N. B.—The props should always be lowered to ease the shaft horse at every opportunity. When the drivers are not dismounted the prop is lowered and put up by No. 5, at the command of the officer.

On the word *Eyes Front* being given to drivers "standing easy," bearing reins will be hooked on, and props fastened up; leading reins unfastened from bridle reins, and the position of stand at ease resumed.

SALUTING WHEN MOUNTED.

A mounted N. C. officer, gunner or driver riding singly, salutes by riding at attention, the right hand extended behind the thigh, looking the officer in the face; with mounted parties, the N. C. officer in charge should give the word *Eyes Right*, or *Left*. Drivers with a pair of horses, whether hooked in or not, salute by passing their whips between collar and pad of off horses, looking the officer in the face, body erect, left elbow close, right arm extended to the right front, with the hand as low as the waist, back of the hand up, and inclined to the front, fingers closed on stock and thong. In trotting drivers do not salute, the right hand, holding stock and thong, rests on right thigh, back of the hand up. Drivers when halted do not salute.

DRIVING GENERALLY.

The art of driving is a modification of that of riding. All the aids are founded on the same principle, so that it has happened that very little has been written or even distinctly laid down on the subject. The following may therefore be noticed :—

The movements of horses in draught are generally slower and sturdier than those of a riding horse; linked together as they are, and the team and carriage possessing considerable weight and momentum, it is not desirable to move any draught horse as suddenly and quickly as one in a detachment or in a rank of cavalry, nor is it easy for a horse to move with the eccentricity and suddenness sometimes exhibited by a well-bred horse in the ranks; hence, sitting in his saddle and retaining his place, especially in the centre or wheel, is comparatively easy to a man of slow parts. The quality of a man's driving is much less obviously perceptible than a man's riding, the legs are partly hidden and the position less conspicuous, while it requires careful watching to see if justice is done to the horses, and where battery horses have but little work to do, one pair in the team might for a short time perform half the entire work without injuring their condition or destroying the general appearance of harmony in the work. Officers and Non-commissioned Officers are, for the most part, in front of the teams, and unless they are vigilant may not observe how the work is done. Drivers are frequently instructed by those who have never driven themselves; in such cases it is not surprising that the instruction should mainly be in that part of their work which consists in riding, while that which is really more important and might tell much on service, viz. the management of their horses, is not brought up to a high standard.

The general guiding rules as to driving are not difficult.

The near horse is moved by the leg on the same principle, but not to the same extent, as a horse in the ranks.

The off-horse is brought in to the near one by laying or pressing the whip over him, touching the off-side just in front of the pad.

The whip with the side rein prevents him curving his neck round towards the driver. There is, generally, no difficulty in bearing the off-horse away by moving the hand and rein towards him. While a gunner is mounted on the off horse its management is left to him though the driver does not let go the leading rein, so as to be ready to control the pair when the gunner dismounts.

The management of the reins is peculiar; the riding horse's rein should be shortened by means of the buckle sufficiently to enable the man to hold it single through his left hand.

The shorter branch of the leading rein should lead to the near cheek, and the longer to the off-cheek of the off-horse's bit. The buckle should be slipped to such a length that when the rein is in the driver's left hand, in its position in front of the centre of his body, it pulls evenly on the two sides of the off-horse's mouth.

Both horses are supposed to be turned to the right by turning the hand thumb down, but it is more generally done by carrying the hand to the right, bearing the off-horse away by placing the whip hand on the rein; this will hardly pull the on-horse's right rein, while the riding horse is thus moved by the pressure of the left rein against the left side of his neck.

Turning to the left is done by turning the hand, little finger down, or by carrying the left hand to the left and throwing the whip over the off-horse's neck.

MOVING OFF FROM A HALT.

At the word *March*, the drivers ease the reins, and close their legs to the riding horses, laying the stock of the whip thong in hand over the necks of the off horses, which will ensure their starting together; this is of great importance, not only to prevent the breaking of the harness, but also the jibbing of the horses.

The spurs are for the riding horse, the whip for the off horse; in using the whip it should be applied over the shoulder or neck, but never when the off horse is mounted, he must then be kept up to his work by the spurs of the mounted gunner.

Wheel and centre drivers must be careful that the horses in front of them are kept in proper draught, the lead driver being responsible for dressing.

To prevent loss of distance, on the command *March* every man should start his horses. Drivers should be specially cautioned not to wait until the carriage in front of them moves off.

The distance of at least four yards, from end of carriage in front, to leaders heads of team following, must always be maintained.

In moving, generally, the lead driver is responsible for the dressing, but to enable him to keep it well, the pace should not be allowed to fluctuate or alter without word of command; he is also responsible that he keeps his horses evenly to their work, but since he is answerable for the dressing his position is fixed, and it lies with the centre driver to see that the lead traces are well stretched; the centre driver then sees to this, and that his horses are working evenly.

The wheel driver sees that the centre driver's traces are well stretched, and that his own horses are doing their share of work and working evenly; indeed, the wheel driver is more responsible for the share of work falling on the horses in the team than any other driver, he should be a sturdily built man, the centre and lead drivers may with advantage be light, while the lead driver requires to know his drill more perfectly than any. The pluck with which a team is driven depends on the lead drivers, and in some measure on the gunner on the off lead.—The mounted gunners should be tall but light and active, rather long limbed to mount easily.

HALTING OR PULLING UP.

This must be done with judgment. When the pace is the walk, the carriage may be stopped at the word *Halt*, by the lead and

centre drivers *feeling* the bits firmly but steadily, and closing their legs for an instant to keep the horses up to the collar. They also raise the whip hand as high as the head, the whip horizontally across the front, as a signal to the wheel driver; the wheel driver pulls up his riding horse, as directed for the lead driver, and with his whip hand takes hold of the leading rein, and inside of riding rein, both hands low, and by a steady firm feeling of both horses' bits, he sets them to the breeching; the moment he stops the carriage, he must ease the reins, and put his horses to the collar, taking care that the leading traces are stretched. In pulling up from the trot, the same aids must be applied, but the carriage must not be stopped too short. Officers should always give the word *walk* before the word *halt* when moving at a trot or gallop, even to come into action; no time is really lost by doing so, as men and horses are steadied, the rattle ceases, the word of command is distinctly heard, and the wheel horses are saved severe strains. The drivers should, therefore, never be allowed to pull up short from a trot or gallop, but always taught to expect a decrease of pace a few moments before halting or coming into action.

ALTERATION OF PACE.

In all alterations from slow to quicker paces, the drivers use their legs and whips as directed in moving from the halt; jerking the horses should be carefully avoided.

TAKING GROUND.

Taking Ground, each carriage wheels, independently of the others, in a direction at right angles to the leading horses' heads. It is done by turning the horses in succession as they come nearly up to the same spot of ground.

The lead and centre horses should be taken out of the collar as they turn the corner until the wheel horses and limber have turned it, otherwise they are apt to draw the outside trace over the horse's back, and also pinch the driver's leg by the horses pulling as it were round a corner.

To ensure the wheelers alone bringing the gun round the turn, it is usual to put them well into the collar and increase the pace a little coming up to the turn.

It will be found in all turns, that it is nearly impossible to bring the limber over the exact ground on which the lead horses turned; it could only be done by a great exertion on the part of the wheel horses; thus, although they are generally put well into the collar, they bring the limber round a little short of the point where the lead horses turned. Hence in limbering up it is usual for the lead horses to jump well over the trail, the limber wheels either going over the trail-eye or close to it; where this is not done the trail-eye is so far from the pintail when the limber has come round into its place, that the latter has to be backed, (which is dangerous,) or the gun run up by the gunners. It is not, however, advisable to drive over the trail, as the loops and fittings are apt to be damaged.

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Taking ground to the right, the lead driver works his horses round, by feeling the inward rein of the riding horse, pressing with his left leg, and taking the leading rein in the right hand, to bear the off-horse off, the gunner when mounted, manages the off-horse. The centre and wheel drivers aid their horses round in the same manner, taking care to follow the lead. The wheel driver must keep the shaft horse from lying in the breeching.

Taking ground to the left.—The lead and centre drivers work their horse's round by feeling the left rein and pressing strongest with the right leg, keeping the whip stock, thong in hand, over the off-horse's neck, (except when mounted) until the turn is completed; the wheel driver works round in the same manner, keeping the riding horse from lying back in the breeching.

REVERSING.

Reversing, each carriage wheels about independently of the others.

Reversing to the left, drivers keep the whipstocks, thongs in hand, over the off-horses, (except as before) circling round to the left, feeling with the left rein, and pressing with the right leg, watching the carriage, the wheel driver taking care to keep his riding horse from lying back in his breeching, otherwise the carriage is liable to be locked and upset.

Reversing to the right, the lead drivers circle their horses round, by feeling the right rein, and pressing with the left leg, taking hold of the leading rein with the right hand, and bearing off the off-horse, (except as before) keeping their eyes on the carriage until the wheel is completed. The wheel driver goes about in the same manner, and must be very careful that the shaft horse is kept up from lying in the breeching.

In all formations the drivers must go well to the rear of the position on which the carriage is to stand, so as to be able to bring it up square.

INCLINING.

Inclining, the carriages each turn in the direction ordered. Inclining is a movement by which a line, or any part of it, is carried on in a parallel direction at the same time that it is gaining ground to a flank.

ACTION.

Action Front.—At the word *Drive on*, the drivers drive on one yard to clear the trail, and reverse to the left at the trot till in line with the guns, then move direct to the rear at the walk; "eyes left," and at the word of command or signal they again reverse to the left, "eyes right," and form in rear of the guns, the leaders ten yards in rear of the trail eye.

Action Rear.—At the word *Drive on*, the limbers move on, incline to the right, reverse to the left, and form up as before.

Action Right.—At the word *Drive on*, the limbers move forward one yard, then take ground to the left, and move to the rear, reverse to the left, and form up as before.

Action Left.—At the word *Drive on*, the limbers advance one yard, then take ground to the right, and reverse to the right.

N. B.—This is the only time when the limber reverses to the right in limbering up or coming into action.

LIMBERING UP.

To the Front.—The gun drivers trot up, inclining to the right, keeping one yard clear in passing the gun; when clear of the gun-wheel they throw right shoulders forward, until the left wheel of the limber is close to the trail-eye and just past it, when the drivers pull up and square the limber, the lead drivers easing their traces, and passing their horses to the right until square, when they again stretch the traces; the wheel driver keeps his riding horse to the collar, taking care that the limber does not run back upon the gun.

To the Rear.—The gun drivers trot up, inclining to the right, and when the limbers are close to the gun the whole reverse to the left, the lead drivers easing their traces, pass their horses to the left to enable the wheel driver to wheel short round; the wheel driver, by holding in his riding, and keeping up his shaft horse, turns the limber, and keeps it from running back on the gun.

To the Right.—The gun drivers trot up; the lead driver passing close to the trail turns to the right, when the wheel driver is in line with it; the lead and centre drivers then ease their traces, and pass their horses off to the right until square in front of the wheelers, when they again stretch their traces; the wheel driver, as soon as he is in line with the trail, turns to the right, and the limber is halted.

To the Left.—The same as limbering up to the right, except that the gun drivers turn off to the left.

In all limbering up the drivers look over their shoulders, to see if the limber is properly placed, and correct it if not; in doing so they must not rein back, for fear of injuring the men at the trail, or running the trail-eye through the limber box, or the knapsack strap, ped to it.

The guns are invariably limbered up at the trot.

WHEELING AND SHOULDERS FORWARD.

All wheels of the battery, or its parts, from the halt are to be made on a flank; during the wheel dressing is to the wheeling flank, which regulates the pace at which the wheel is made, care being taken that the correct interval is preserved from the pivot.

When wheels are made on a fixed pivot the pivot gun must move towards the rear, and wheel about to enable it to form up square. The other subdivisions come into line in succession.

Wheels are made on a movable pivot, except in wheeling from column into line or line into column, which can be done on a fixed pivot.

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In wheels on the move the pace must be checked at the pivot and increased at the wheeling flank, so that it may be completed by every subdivision at the same moment, when the word *Forward* is given.

To wheel half or quarter right, or left, the word of command is *Half or Quarter—Right or Left*. If it is required to complete the wheel to the full quarter circle, after having wheeled "half right" or "half left" the word is *Right or Left*.

In throwing shoulders forward both flanks are kept in motion, the pivot describing part of a circle, and the outer flank and intermediate subdivisions, by a compound of inclining and wheeling, conforming to the pivot movements. To perform wheels on this principle the word is *Right or Left Shoulders*, followed by *Forward*, when the required degree of wheel has been attained.

When a battery in line or a division wheels about inwards the subdivisions pass each other bridle hand to bridle hand.

INTERVALS AND DISTANCES.

Intervals and Distances are measured from Nos. 1 to Nos. 1, when limbered up, and from axle to axle when in action.

INTERVALS.

IN LINE.	Close Interval.	Between Subdivisions.	{ 3 paces between Nos. 1.
"	Half Interval.	Between Subdivisions.	{ 10 paces, with 6 horses.
"		Subdivisions.	{ 8 " 4 "
"	Full Interval.	Ditto.	{ 20 " 6 "
"	"	"	{ 15 " 4 "
		Between Batteries and other Troops.	{ A Subdivision interval and a half, viz., 30 paces, with 6 horses.
			{ 20 " 4 "

FRONTAGE.

The extent of front of a Battery of Canadian Field Artillery, (4 guns with 6 horses,) full intervals is three, subdivision intervals (60 paces,) plus the front of one subdivision, 3 paces with one pace extra for every mounted man that may be in line on the flank, say 65, plus 30 paces on each flank to allow of reversing. *i. e.* 125 paces for a 4 gun battery with 6 horses, 90 paces for a 4 gun battery with 4 horses.

DISTANCES.

Column of Subdivisions	- -	{ 20 paces, with 6 horses.
"		{ 15 " 4 "
Divisions	- -	{ 40 " 6 "
"		{ 30 " 4 "
Batteries	- -	{ 100 " 6 "
"		{ 90 " 4 "

Full wheeling distance at full interval should be maintained, unless otherwise and specially ordered.

Column of Route.—The distance to be preserved in this case is 4 paces between the rear of one carriage and the lead horses of that immediately behind it.

DEPTHS.

The depth of a Column of Route of a Battery of Field Artillery without wagons is four subdivision intervals plus four paces; for every additional carriage with six horses 20 paces must be added; with 4 horses, 15 paces, in round numbers, 100 paces for 4 guns, 6 horses, 80 paces for 4 guns, 4 horses.

In Column of Route of a Brigade of Batteries a distance of half a subdivision interval must be allowed between each battery, and calculated for accordingly.

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PARADE.

TURNING OUT.

Boot and saddle is sounded half an hour before the *Turn out*. The men must never turn out until the trumpet sounds for that purpose.

No man before turning out is to feed or clean his horse in his boots and spurs, a sufficient time will be allowed before he need begin to accoutre himself.

On the *Regimental call* being sounded the men of each subdivision will fall in on foot in front of their own stables, where they will be inspected by their Nos. 1, and the reports made to the sergeant-major. The mounted men of each subdivision will then be marched into stables ready to turn out when ordered, and the dismounted men marched to the Gun Park under the quarter-master-serjeant.

At the *Turn out* the subdivisions are formed up mounted in front of their stables, inspected by the Nos. 1, marched to the Gun Park by the subaltern officer on duty and hooked in. No. 1 puts on the fure pocket, and No. 5 the tube pocket.

The officers will then inspect their division in the following manner:—*Detachments rear*—*Draw Swords* (open ranks); inspect every man, horse and carriage, observing that each man has the whole of his appointments, that they are properly put on, and that the carriages are properly equipped, (then close the ranks), *Return Swords*, and *Sit easy*, and report to the subaltern on duty, who will then call the battery to *Attention* and tell it off.

TELLING OFF AND PROVING.

A Battery.

The Battery, limbered up, is told off by subdivisions, and divisions, as follows:—

Number your subdivisions from the right. The Nos. 1 number the subdivisions. The battery is then told off.

1 and 2 *Right Division*. 3 and 4 *Left*.

1 and 3 *Right subdivisions of Divisions*. 2 and 4 *Left*. 2 and 3 *Centre subdivisions*. No. 2 is the subdivision of direction (unless otherwise ordered).

The battery is then proved by naming a subdivision, division, or any individual number of the gun detachment. At the word *Prove*, every man of the named subdivision raises the right arm as high as the shoulder, and extends it to the front, keeping it up until another part is ordered to prove. When the whole have proved, the word *As you were* is given, and the right arms are dropped. The word *Sit easy* is then given, and the report made to the commanding officer.

Should the original order of a battery in the field be changed either in line or column, it may be renumbered, in line from right to left, in column from front to rear. If this is not done it should cause no confusion; all words of command apply to the then right or left, the right gun being always considered as No. 1. The muzzles of guns in action being the front, the horse's heads when limbered up.*

Spare carriages, when with the battery, form a third line in rear, carriages covering their own subdivisions.

Officers must pay particular attention that all motions required of the soldiers are done with the same smartness as on the general parade.

A Brigade of Artillery.

The brigade having assembled in quarter column, the adjutant proceeds to tell it off by numbering the batteries from front to rear. He then names them No. 1 or Right Battery, No. 2 or Right Centre, No. 3 or Left Centre, No. 4 or Left Battery; the battery of direction and the two centre half batteries. The centre battery with an odd, and the right centre with an even number of batteries is the battery of direction in line, unless otherwise ordered. The brigade is then "proved" by naming any part of it previously numbered, in the same manner as laid down for a single battery.

When batteries in brigade lose their order the commanding officers will renumber them, if ordered by the commandant of Artillery, if not so renumbered the battery on the right (if in line in front if in column) will be considered No. 1.*

POSTS OF OFFICERS AND MOUNTED NON-COMMISSIONED

OFFICERS, &c.

Commandant of Artillery.

In line.—Three horses' lengths in front of the centre of line of officers commanding batteries.

Commanding Officer.

In line, limbered up.—Three horses' lengths in front of the centre of the battery.

In column of batteries.—One horse's length in front, and three on pivot flank.

In column of subdivisions, or divisions.—Three horses' lengths on pivot flank of centre of battery.

* In giving orders it is best for officers to speak of the leading, right, left or rear battery, division, subdivision or gun; it prevents all chance of error—and inversion is not of the slightest consequence to Artillery so handled.

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The positions assigned to the commanding officer are those to be taken up when the formation is completed, while it is in progress his post is, wherever he can best superintend and be heard by his battery.

Two Senior Subalterns.

In line limbered up.—In the centre, between their subdivisions in line with the leaders of the guns.

Advance to order.—One horse's length in front.

When guns have to go to the rear of the alignment in order to obtain ground to form, the subalterns halt on the alignment.

In column of subdivisions or route.—One horse's length on the pivot flanks of the centre of their divisions.

In column of divisions.—In the centre, between their subdivisions in line with the leaders of the guns. In marching past, subaltern officers take order one horse's length in front of the centre of their divisions.

In close intervals.—A horse's length in front of centre of their divisions.

In action.—Superintending the guns of their divisions.

Third Subaltern.

In line, limbered up.—In the centre of the battery, in line with gun leaders.

Advance to order.—One horse's length in front.

In column of batteries.—As in line.

In column of subdivisions or route.—One horse's length on the pivot flank of the centre of the Battery.

In column of divisions.—A horse's length in rear of the centre of the leading division.

In action.—He dresses the guns, assists the commanding officer in general superintendence.

He dresses all points of formation, gives the word *Steady* when they have been correctly taken up and the formation complete.

Adjutant.

In line, limbered up.—In centre of the brigade, in line with the leaders of the guns.

When there is an uneven number of batteries, one horse's length from and on the off side of the officer in the centre of the centre division of centre battery.

In advancing, in line with the commanding officers of batteries. When there is an uneven number of batteries, a horse's length on the right of the commanding officer of centre battery.

In column.—Three horses' lengths on outer flank of leading battery, in line with gun leaders.

* When guns are merely manœuvring for parade purposes, accuracy of dressing must be maintained, Nos. 1 looking to the gun of direction, and running up or back: but in taking up a fighting position a favorable emplacement is of great importance, the dressing of no consequence.

In double column.—Three horses' lengths on outer flank of head of the column.

In echelon.—Three horses' lengths on the outward flank of leading battery.

Surgeon and Veterinary-Surgeon.

For inspection parade.—In line on the right flank, one horse's length from it in line with the lead horses' heads, in column in rear. Non-combatant officers do not draw swords.

Battery Staff Serjeant.

In line, limbered up.—The serjeant-major one horse's length in rear of No. 1 subdivision. The quartermaster-serjeant the same in rear of No. 4 subdivision.

In column of batteries.—As in line.

In quarter column of batteries.—On the flanks of Nos. 1 and 4 subdivisions, in line with the gun axes.

In column of route, or column of subdivisions.—Serjeant-major on the outer flank of the leading gun, in line with the leaders; the quartermaster-serjeant one horse's length in rear of the rear carriage.

In column of divisions.—The serjeant-major between the guns, in line with gun axes of the right, the quartermaster-serjeant between the guns of the left division, both serjeants covering the subaltern officers.

When the wagons are detached, the quartermaster serjeant is with the wagons. He keeps them as much as possible out of fire, and takes every advantage of ground and cover, but should never lose sight of his battery, and keep communication with it.

Artificers.

In line, limbered up.—The farrier, when mounted, one horse's length in rear of No. 2 subdivision.

In column.—One horse's length on outer flank of battery, dressing by junior subaltern.

The other artificers are told off in the gun detachments.

Trumpeters.

In line, limbered up.—One with commanding officer, the other one horse's length in rear of No. 3 subdivision.

In column.—One with the commanding officer, the other one horse's length on the outer flank of centre of the battery.

Nos. 1.

Of Field Batteries are always mounted, except when in action, and during manoeuvre remain on the left of the lead drivers of their subdivisions, who hold their horses in action, bring them up in limbering with 4 horses—with 6 horses this is done by the centre drivers.

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Mounted Coverers.

Of Field Batteries, on left of the leaders of the wagons.

Without wagons, covering the No. 1, and in line with the centre horses of the gun; they are then told off as gun numbers, in action the centre drivers hold their horses as the lead hold those of No. 1.

COMMANDS AND SIGNALS.

All words of command should be given in a firm, loud, and explicit manner by the commanding officer, who should if possible be to windward of his command; they should be instantly repeated by the officers commanding batteries at brigade drill, and officers commanding divisions at battery drill, who then give their executive words of command. The Nos. 1 do not give words of command, except when subdivisions act independently, the executive words are then given by them. The bugle should be rarely used, except to order the battery when the battery is in motion, and never when acting with other troops. If there is a division without an officer, the senior No. 1 of that division commands it, and gives all divisional words of command as well as the words for his own subdivision; he does not fall out, but remains on the left of his gun leaders.

The sword arm signals as before described, should habitually be given with the word of command which is often inaudible when the battery is on the move.

RULES FOR MARKERS.

GENERAL.

When the adjutant and markers take up points for formation they draw swords; if marking for line, the hilt of the sword is to be held close to the right cheek, edge to the front; if for column the sword is to be at the recover. On receiving the word *Steady* from the officer or serjeant-major dressing the points, they return swords. When the formation is complete and the word *Eyes Front* given, they fall in.

In taking up points for formation in line, markers face the new alignment, their horses' heads six inches from it.

In advancing in line, the adjutant raises his sword as high as his cheek, edge to the front.

* In very heavy country and bad roads, Nos. 1 and coverers and even a 3rd non-commissioned officer may sometimes be hooked in with the breast harness, and form a team of 9 horses, 3 abreast, which is a very powerful system of draught when width of roads permit; when such draught is anticipated, as in a spring or autumn campaign, a short iron arm can be fastened on the near side of splinter bar, to which a swingletree can be attached; in action the horses can be left in their places, the drivers holding the reins when the riders dismount.

For formations in column, the markers face in the same direction as the column, six inches from the pivot flank.

Markers as a rule do not take up points for action, should they be ordered to do so, the gun axes are to be dressed on them.

In forming up on parade with other troops both flanks of the front should be marked.

BATTERY.

The markers for a battery are the serjeant-major and quarter-master-serjeant, who are placed by the junior subaltern.* They mark for the points nearest to their position in the original formation.

In forming line or deploying from column, the marker of the base formed on, places himself facing the No. 1 of the outer subdivision; the junior subaltern one horse's length on the outer flank facing the alignment. The other marker marks a point in the alignment beyond the flank.

In forming column, the marker nearest the pivot flank of the base places himself there, the captain one horse's length in front of and facing him; the other marker will give a point beyond the depth of the column covering the base marker.

In changing front in line on a flank subdivision, if to the right, the serjeant-major marks for the right subdivision, the quarter-master-serjeant gives the other point. They are dressed by the junior subaltern, who is one horse's length on the left of the serjeant-major.

In changing front to the left, the converse is the case.

In changing front on a named subdivision, the marker nearest that subdivision marks for it, the other marker giving the other point, the junior subaltern one horse's length on the outer flank of the marker of the named subdivision dressing the points.

BRIGADE OF BATTERIES.

The markers employed in brigade movements are the acting brigade serjeant-major of each battery, who are placed and dressed by the adjutant. When the word "Marker" is used in the following movements it refers to the battery serjeant-major.

In forming line from column, the base is given by the acting brigade serjeant-major and marker of the battery formed on, who

* There being only two divisions in a Canadian Battery, the third subaltern is employed similarly to a captain in the R. A., where the commanding officer is a major. There are in the Canadian Artillery no divisional or subdivisonal markers, who in the R. A. are mounted non-commissioned officers in charge of wagon teams. Where markers are particularly required for each subdivision, such as in forming for review with other troops, &c., the Nos. 1 can be ordered each to mark for his own gun, being dressed as before by the third subaltern.

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place themselves opposite the Nos. 1 of the flank subdivisions of the base (the brigade serjeant-major opposite the left, the marker the right). The adjutant places himself on the outer flank of the base, (unless he can dress a longer front from the pivot flank,) corrects the direction of the base points, and dresses the markers, who mark for the subdivisions nearest the base, and should arrive at their places on the alignment, about 40 yards in advance of their batteries.

In forming column, the marker of the battery on which the formation is to be made places himself on the pivot flank, the other markers take their distances from him. The brigade serjeant-major faces the marker of the base battery, the adjutant places himself behind the brigade serjeant-major and corrects the covering.

In deployments the base is given by the brigade serjeant-major and marker of the battery formed on, who are placed at the head of the column by the adjutant. In other respects markers act as already laid down for formation of "Line from column."

In changing front the base is given by the marker of the battery formed on (who marks for the right subdivision), and the brigade serjeant-major (who marks for the left subdivision). The markers for the remainder mark for the subdivisions nearest the base. The adjutant superintends the dressing from the outer flank, unless he can dress a longer front from the pivot flank.

When a brigade in column enters a distant position, the adjutant marks the point of entry. When a column changes its direction, the adjutant marks the point where such change is made; if the changes are frequent, the brigade serjeant-major assists.

DRESSING.

The word *Dress* means to the hand to which the men are then looking; but when the dressing is to be to a different point, it will be expressed by the words *Eyes Right*, *Eyes Centre*, or *Eyes Left*. When completed, the word *Eyes Front* is given, that heads may be turned square to the front.

In dressing the horses stand straight to the front, and the men's bodies perfectly square, each casting his eye along the next man's face by turning his head in a very small degree towards the dressing hand.

A battery should always dress forward, and if too far advanced it must reverse, and come up to the alignment. When advancing in line, the No. 1 of the subdivision of direction will take up points on which to march, the other Nos. 1 taking their intervals from and dressing by him. With unequal teams, viz., 6 and 4, the lead driver of the latter team dresses by the centre driver of the former.

After formation, when all is correct, the adjutant or junior subaltern, as the case may be, gives the word *Steady*, and the commanding officer *Eyes Front*, when the markers return to their proper places by the shortest route.

In movements in echelon, dressing is invariably by the flank advancing from or wheeled to, and the distance preserved from the preceding battery, division, &c. By attention to these two points the echelon when halted will be in a situation to come into action in any direction, or form line either parallel to the line it quitted or oblique to it.

In dressing in line at brigade drill, commanding officers face the centre of their batteries, with their horses' heads within six inches of the line. Each commanding officer gives the word *Eyes Front* as soon as his own battery is properly dressed, and the front of the next has arrived on the alignment; upon this word the commanding officer fronts and moves up to his post, three horses' length in front; the marker goes to the rear, and the men look to their front; but the base invariably remains posted until the whole brigade is formed, and the words *Eyes Front* given by the commandant. In resuming their posts commanding officers turn their horses right-about.

When the brigade is to be accurately dressed for purposes of parade, the caution is given *By the battery of direction, dress*; the brigade serjeant-major and marker of the battery of direction advance one horse's length in front of the flank subdivisions of the battery, and turn to the right-about, the commanding officer also turns to the right-about; the brigade serjeant-major and marker then raise their swords to give a base, which is corrected by the adjutant; all markers then move out, and turning their horses to the right-about, take up their dressing from the base. On the word *March*, the subdivisions move steadily up with eyes to the centre. When the dressing is completed, the commanding officer gives the word *Eyes Front*; the whole resume their posts. A single battery is accurately dressed for parade purposes in a similar manner.

Dressing in line is by the subdivision or battery of direction. In column or double column the left directs, unless otherwise ordered.

In successive formations of line each commanding officer gives the word *Eyes Front* as soon as his battery is properly dressed, and the next battery has arrived on the alignment; upon this word the marker falls in, but the base markers invariably remain posted until the line is formed, and *Eyes Front* given by the commandant.

For purposes of parade or review with other troops, the horses heads are aligned with the contiguous infantry or cavalry, either in line or contiguous column, when it is required to come into action to fire a salute or any other parade purposes, the gun teams are advanced until the gun axes are aligned with the contiguous troops, the word being in this case, *Battery will advance for action, walk, march, halt, action front*. After firing a salute, they will rear limber up, retire, left reverse and come up square, dressing as before with horses heads on alignment of contiguous troops.

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PRELIMINARY OBSERVATIONS.

MANŒUVRES.

The first principle always to be remembered is that a battery has no fixed right or left, and only acknowledges the front to which the guns point when in action, or the horses face when limbered up.

Before commencing manœuvres, the commanding officer gives the order *Off gloves, Loop Swords*. The gloves are placed on hook of sword belt, which is passed through both button-holes, the swords are then looped as follows: change reins from left to right hand, take hold of the scabbard at the top ring, pass the hilt from front to rear under both slings, point of the scabbard kept down; the sword is then hooked edge to the rear, the sword knot passed upwards under the waist belt behind the rear sling and drawn tight; reins are shifted from right to left hands. Officers, staff serjeants, and trumpeters do not loop swords.

The men on the carriages place their gloves in the pocket of the blankets underneath the straps.

The *Trot* is the pace of manœuvre, and should be regulated with reference to the slowest horse. It is, however, not advisable to start the trot from the halt without walking a few paces first. The word of command should therefore be, to commence all movements, *Walk, March*. When it is required either to *Trot* or *Gallop*, those sounds or commands will be given after *March*.

In all formations of either line or column, at any pace exceeding a walk, the word *Walk* is invariably to precede by a few seconds the words *Halt—Dress*.

If a formation is ordered when a battery is moving at the walk, that pace will be preserved by the "base" body, while the pace of each portion of the remainder will be increased or diminished as may be necessary, until the formation is completed; but if moving at the trot, and the formation is at the head of the column the pace of the "base" body will be diminished to the walk until the formation is completed, when the trot will be resumed.

Should a brigade or battery be moving when a formation is ordered, the "base" body will advance its own depth and halt; if forming line to the front from column, the rear of the column completes the formation by an oblique movement. If the caution *On the Move* is given the base body continues to move on at the original pace, while that of each portion of the remainder, will be increased, or diminished, as may be necessary until the formation is completed; except when the formation is on the head of the column, which will walk.

Artillery can be wheeled about on its own ground as far as frontage is concerned, but when acting with other troops, sufficient interval should be allowed on each flank to enable the subdivisions to wheel outwards if required. As a general rule when carriages reverse they do so to the left. For review or parade purposes it is

more convenient for artillery to remain in the rear of any intended alignment until the other troops are finally formed, unless ordered to the front to cover the formation. In manœuvres they should always cover the formations, generally having to go to the flank or front to do so.

Although the admixture of guns of different batteries may be unavoidable on service, it is most desirable at drill that the battery as a unit should not be broken up. When it is not necessary the subalterns' divisional unit should never be broken up.

All formations of line from column, or column from line, are made at full intervals unless otherwise ordered, without reference to whether the battery or brigade was at full or close intervals.

In all standing formations, either from line or column, the part next to that formed on makes two square movements, the next part inclines. In column, if the command "Form line" is given (and no flank named,) the line is to be formed on the left of the head of the column. If the line is ordered to be formed on the rear of the column (and no flank named) it will be formed on the right of the rear. In any case, *left, or right of the front, or rear, form line*, may be given.

When artillery is about to advance or retire through a line of infantry or cavalry, notice should be sent to the officer who commands it, that an opening may be ordered without confusion.

All officers should know the number of yards which the front of a battery or any of its component parts occupy, and be able, by the eye and the pace of their horses, rapidly to take up such distances.

In moving over rough ground it is desirable that the Nos. 1 should ride some distance in front of their subdivisions, in order to point out the best ground for the guns to pass over.

Carrying Gun Detachments.

Gun detachments should be mounted under the following circumstances:

a. When rapid movements are intended.

b. When marching past at the trot, or galloping past.

When manœuvring No. 1 is mounted, two men will be carried on the axle-tree boxes, and three on the gun limber, and two on the off horses, as laid down. Even when wagons are horsed they should not accompany their guns, but should follow their movements at a distance of about a quarter of a mile, under the senior sergeant.

Gun detachments will be dismounted as often as circumstances will admit in order to ease the horses, but it should be equally borne in mind it is of great importance that the gunners working the guns should be brought into action as fresh as possible.

On ordinary marches, when action is not anticipated, the gunners should always march on foot.

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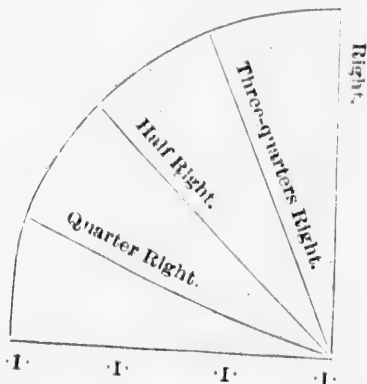
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COLUMN FROM LINE.

From line all formation of column will be in the rear of the named battery, or part of a battery, if the formation is on a central battery or part of a battery, those on the right will form immediately in rear of the base, and then those on the left.

CHANGE FRONT.



When a line is ordered to change front to a flank, it is understood that the longest arm will be thrown forward, unless otherwise ordered. In throwing a flank forward, such change is usually made on the flank subdivision, division or battery, which immediately changes front in the required direction and gives the base.

When a change of front is made by throwing a flank back, the base portion or battery changes front by wheeling up, the other batteries are reversed by subdivisions, conducted to a sufficient distance beyond the new alignment, again reversed, and move up into line.

A change of front may be made on any battery, the named battery changing front on its flank gun; or the change may be made on any gun of any battery.

When guns are in action and a change of front is ordered, the gun named, on which the change is made, comes into action in the new direction at once; the other guns move at the word *March*. When the ground admits, and the change of front is not a complete quarter circle, the guns next the pivot gun are run up by hand.

When guns are formed in line for action in succession, they are loaded and fired as soon as formed, (unless directed to the contrary). When the line is formed the guns take up a steady rotation of fire. The whole of the guns should never, unless specially ordered, be fired at once, some being supposed always to be in readiness to meet a sudden close advance of cavalry or concealed infantry. The same holds good in retiring successively from action, the remaining guns in action cover those retiring, by their fire—of course waiting till their front is clear. Steady firing is continued until *Stand fast* or *Cease firing* is ordered. If ordered to fire a certain number of rounds, the firing should commence from the right or left of batteries, according to the wind; a regular and continued fire will thus be maintained.

A brigade or battery in line may advance or retire by subdivisions or divisions from the right or left of batteries, thereby becoming a column, moving to a flank in this formation it may pass obstacles or broken ground, without risk or disorder, or without material loss of distance in the general line.

ECHELLON.

Direct echelon is formed by the successive march of batteries, divisions or subdivisions, to front or rear, and is particularly adapted to resist attacks in front or flank.

Oblique echelon is formed by wheeling batteries, or any part of them, less than a quarter-circle, so as to be oblique to the former front, and parallel to each other. It is used to gain ground to a flank while moving to the front. The distances and intervals should be carefully preserved.

CHANGE OF FRONT AND POSITION.

The changes of front and position are made by the echelon march of subdivisions, divisions or batteries, either to the front or rear, which are wheeled, half the angle ordered for the base, towards the new front, and are conducted to it by their inward flanks; on approaching their positions the wheel is completed and the line formed.

Changes of position from one distant situation to another are made either in line, by the direct echelon, by the oblique echelon of batteries or their parts, by battery columns of divisions or subdivisions. In changes of position by oblique echelon, the batteries move to the new position, where the base again wheels the required degree into the new alignment, and the formation is completed in the usual manner.

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DRILL.

COLUMN.

PART I. SEC. II.

In formations of line from column, the line may be formed on either or both flanks of the head of the column. In column, if the command is *Front, Form Line*, the line is formed on the left of the head of the column. If it is intended to form the line on the right of the head of the column the command is *Right of the front, Form line*. If the line is to be formed on both flanks, the portion which is to form on the right is that immediately in rear of the head of the column. If the line is to be formed on the rear it will be on the right of the rear of the column, unless otherwise ordered.

Deployments are similarly made from quarter column and on the head of the column to either or both flanks.

Forming line from any position should be practiced; for example, when the head of a column of divisions or subdivisions has wheeled to the right, or left, to form line to the front or a flank before the rear divisions have entered the new direction. The word of command for the rear divisions depends on the position they may be in at the time the word to form line is given, and must be regulated accordingly.

Changes of direction in a quarter column must always be made on a movable pivot to enable the rear gradually to comply.

Distant positions, where circumstances will allow, are taken up by the march of the column, for this purpose the whole line wheels to the hand ordered, by batteries, half-batteries, or divisions, and moves off in a general column, which may also advance from the right, left or centre of the original line.

ACTION.

It is advisable at drill occasionally to take up fighting positions for instruction, the order being so given.

As a rule in coming into action, the range and projectile is named by the commanding officer, together with the flank from which the fire is to commence—generally from the leeward flank—an interval being allowed to elapse after firing the first gun, sufficient to observe the effect and alter the laying. This rule must be continued with the other guns.

Guns are brought as rapidly into action as possible, the inversion of the order in which they stand on parade, or the exact preservation of the interval or dressing, are matters of little importance when taking up a fighting position.

The nature of the ground governs the position of guns, and every advantage should be taken of any cover which will protect the limbs from the enemy's fire without sending them too far to the rear.

The attention of officers in action should be principally directed to the effect of the fire of the gun, which should on these occasions be estimated on a selected object, the distance being judged or calculated, so that they may order any alteration required in the elevation or laying.

Previous to taking up a position the officer commanding the battery, or some one sent by him, should ride forward and select a suitable site for the battery to come into action.

A column expecting to be attacked on a flank will, of course, march with no greater front than subdivisions.

When a battery in line is ordered for action, the guns are not to be loaded until the word *Load* is given by the commanding officer, who will specify the nature of ammunition to be used. This must be loudly repeated by the officers, and instantly taken up by the Nos. 1, that no mistake may arise in the execution. The guns are not to be fired without orders.

No gun should be fired until the gun which formed next after it has been unlimbered, the limber reversed, and cleared of the front.

On *Stand fast* being ordered, guns then loaded are not to be fired off, but the detachments will await further orders.

On *Cease firing* being ordered, all guns then loaded are to be fired off, and on no account is a gun ever to be limbered up when loaded. Guns should be laid on some definite object, and it is only by concentration of fire that great results are obtained.

With the exception of case shot, the first few rounds at an unknown range must be trial shots, and should be fired slowly and carefully even with blank, and the range at first should be habitually under-estimated, as it is more easy to correct the range when shot strike in front of the object fired at than beyond it. Independent fire should not be employed until the range is supposed to be thoroughly ascertained, and then only when a great effort is required. These ideas should be carried out habitually at drill, so as to accustom men to the requirements of war, and nothing should be practised in peace that would be impossible or disastrous in war.

When guns are in heavy ground they should be brought into action in the required direction by the word *Action rear*, so as to save the gunners unnecessary labor; for a similar reason they should be limbered up to the rear.

To keep guns concealed as much as possible in such positions as the reverse side of slopes, &c., they should be halted, and the detachments dismounted under cover. Nos. 1, under instructions from their officers, advancing on foot, mark the exact position for their guns. When this has been done each gun should be moved to the spot indicated.

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FIELD MANŒUVRES.

FORMATION OF A FIELD BATTERY.

A battery of Canadian Artillery consists at present of 4 pieces of ordnance.

The men required for the service of each piece are 8, of whom one is a mounted non-commissioned officer. No. 1 is the senior non-commissioned officer of the subdivision. Each piece of ordnance is on service, attended by an ammunition wagon, on which spare men may be mounted; but the ammunition wagons are, when possible, to be kept out of fire or under cover.

Since the introduction of rifled breech-loading small arms and cannon, it is desirable to bring an effective minimum of men and horses under the inevitably destructive fire of modern weapons. The artillery ammunition wagons cannot therefore be brought under fire, or manœuvre with the guns as formerly. It is not desirable to practice in peace what is impossible in war. If the habit of carrying gunners on the ammunition wagons is continued, the gunners must either be left in the rear, or the wagons brought under fire. The alternative being bringing guns into action without gunners, or carrying them upon ammunition wagons, at the risk of both being blown up. One who has seen that calamity on the field of battle, may be excused for pressing the importance of the subject upon those, with whose military efficiency, he hopes in some measure to be connected. The Inspector of Artillery, with the approval of the Major General commanding, has prepared and printed the details of the simple system of drill, here laid down, on the same principle as that practiced by the old Bengal Horse Artillery, and now by the Royal Artillery in field movements, when they carry an effective gun detachment on the limbers, gun axle seats, and on the saddles of the off horses.

EXPLANATION OF THE FIGURES USED IN THE PLATES.

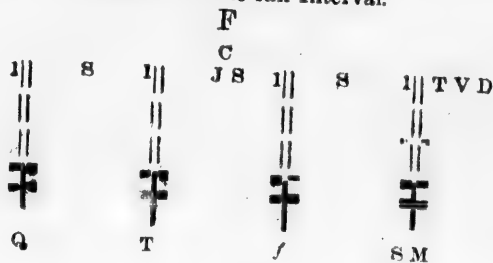
F	The Front.
C	Commander.
S	Subaltern officer.
JS	Junior Subaltern.
SM	Battery Serjeant-Major.
Q	Quartermaster Serjeant.
1	No. 1.
M	Marker.
f	Farrier.
T	Trumpeter.
D	Doctor.
V	Veterinary Surgeon.
A	Adjutant.

== =  A gun limbered up.

 A gun unlimbered.

The first positions are represented in black, the changes dotted.
Plates of a single battery are on a scale of 30 paces to an inch; of
a brigade on a scale of 60 paces to an inch.

Battery in Line full Interval.



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DRILL.

PART I. SEC. II.

MANŒUVRES OF A BATTERY.

The following instructions are for a battery of 4 guns, six horses in each carriage:—The movements of wagons must be considered separately, for the reasons before stated.

No. 1.—FROM LINE TO COME INTO ACTION.

Commanding Officer.

Officers

Nos. 1.

*Action Front.**Action front.**Dismount.*

At the word *Action Front*, given by the commanding officer and repeated by the officers, the Nos. 1 order their detachments to *Dismount*, when the No. 1 and gunners, spring off the horses and carriages, the centre drivers of the guns lead the Nos. 1 horses to the rear; as soon as the trail is clear of the limber hook the Nos. 5 give the word *Limber Drive on*, and the limbers reverse as laid down in the instructions for drivers, and proceed to the rear dressing by the left, the staff sergeants go to the rear with the limbers; the serjeant-major, when they are sufficiently to the rear, gives the command or signal *Left Reverse* to the whole, and halts them by command or signal when 10 paces from the trails of the guns.

When it is necessary for officers to dismount, their horses will be held by the lead drivers of Nos. 1, 2 and 3 on their near side.

For drill purposes the guns are dressed by the third subaltern on the gun of direction.

LINE CHANGES OF FRONT FOR ACTION.

Neither personal experience in war nor accounts in books give any but rare instances necessitating a complete change of front in action equal to a quarter circle. It must be borne in mind that an enemy would be preternaturally active and mobile, or overwhelmingly superior in numbers, to compel a complete change of front, involving a march in column under fire, such as would have to be made by the advanced or retired flank of a long line of battle, which would have to move on the quadrant of a circle, of which the line of battle was the radius. If the history of past wars shew such movements to have been comparatively rare, future wars will probably prove them to be impossible. A battery on a flank may sometimes, however, have to be thrown forward *en Vair* or back *en potence*. The manœuvre has, therefore, to be practiced; but a quarter or half change of front is often required, and should be more frequently practiced than a complete change: it is also more difficult of accurate execution—and accuracy of manœuvre is necessary, as the general direction of the fire depends on it. In the noise and confusion of battle it is simpler to effect such a change of front than to throw round the trails of each individual gun, without throwing a flank forward or back. It is difficult to prevent even trained gunners from lapsing into fire perpendicular to their front, especially when the smoke hangs. Moreover, in such circumstances, when the trails only are thrown round, and the original alignment left unchanged, there is danger of bursting projectiles scattering among the guns on the right or left of a line.

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fought. It is most of all essential to change front rather than trust to the direction of the trail of each gun when the change has been necessitated by the advance of your own infantry or cavalry. A quarter change of front, which is only one sixteenth of a circle, will seldom expose a battery to enfilade, as a quarter circle change would inevitably do. Therefore, the former must be most frequently practiced, and is almost invariably necessary to cover every deployment of your own infantry from the flank, where artillery is generally posted.

LINE CHANGES OF FRONT IN ACTION.

1. *Change front right for action* implies that the left is thrown forward a quarter circle—generally on the right gun. Sometimes on a centre gun, (No. 2) necessitating the retirement of the shortest arm.
2. *Change front three-quarters right for action* is the same in principle, left being thrown forward 67°-30.
3. *Change front half right for action*, also the same in principle, left being thrown forward one eighth of a circle.
4. *Change front quarter right for action* same as above in principle, left being thrown forward one sixteenth of a circle.
5. *Change front left, three-quarters left, half, and quarter left, for action* is the same in principle as before, right being thrown forward.
6. *Change front right or left, back; three-quarters, half, quarter, left, back for action*, means that the right or left is thrown back on the arc specified.
7. *Change front to rear for action*.—Should a battery be ever so unfortunate as to require such a change, the word *Action rear* will suffice, the limbers trotting past on the right of the guns, and reversing to the left, the trails being thrown round the half circle to the left. The ammunition wagons, if not captured, would be fortunate to get round by a considerable detour to avoid the new line of fire.

No. 2.—CHANGE FRONT RIGHT FOR ACTION.

Commanding Officer.

Officers.

No. 1.

Change front right for action—March.

Of Left Division —
Cease firing — *Front*
limber up— *Walk--*
March.

Of No. 1, (Right gun.)
Action right — The
trail is thrown round
quarter circle to left,
With— Load— Fire.

Of No. 2, *Run up*, if
the ground permits,
if not— *Front limber*
up— Walk— March—
Left Shoulders— Halt
Action front— With—
Load— Fire.

Of No. 3, *Front limber*
up— Walk— March—
Trot— left shoulders—
Walk— Halt — Action
front— With— Load —
Fire.

Of No. 4, do

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At the caution the right gun comes into action, and opens fire in the new direction, at the word *March* the others move as ordered, and open fire as they come up, in succession.

Limbers follow the guns, making a left shoulders forward, except limber of No. 1 which moves left incline, left reverse, covering gun.

No. 3.—CHANGE FRONT RIGHT FOR ACTION ON CENTRE GUN, (No. 2.)

Commanding Officer

Officers.

No. 1.

Change front right for
Action on No. 2 —
March

Of Left Division —
Cease firing.

Of No. 1 (Right gun) —
Run back if ground
permits, if not, Cease
firing — Rear Limber
up — Walk — March —
Left shoulders — Halt
— Action rear — With
— Load — Fire.

Of No. 2, Action right-
trail thrown round
quarter circle — With
— Load — when front
is clear — Fire.

Of No. 3, Run up, (if
ground permits,) if
not — Front Limber
up — Walk — March —
Left Shoulders — Halt
— Action front — With
— Load — Fire.

Of No. 4, Front Limber
up — Walk — March —
Trot — Left shoulders
Walk — Halt — Action
front — With — Load —
Fire.

At the caution centre gun comes into action in the new direction, and opens fire as soon as the front is clear, the others move at the word *march*, opening fire as they get into place, in succession.

No. 4.—CHANGE FRONT THREE-QUARTER, HALF, OR QUARTER RIGHT, FOR ACTION.

Commanding officer.

Change front three-quarter, half, or quarter right, for action—March.

Officers.

Of Left Division—
Cease firing—Front
limber up -- Walk --
March.

No. 1.

Of No. 1, Trail three
quarters, half, or
quarter left for action
— With—Load—Fire.

Of No. 2, Run up—
Halt—Action front—
With—Load—Fire.

Of No. 3, Cease firing—
Front limber up—
Walk—March—Left
shoulders—Halt—
Action front—With—
Load—Fire.

Of No. 4, Cease firing
— Front limber up
— Walk—March—
Left shoulder—Halt
Action front—With
—Load—Fire.

At the caution the base gun comes into action, and opens fire in the new direction, the others move at the word *march*, opening fire as they come up, in succession as before, without further order from the battery commander.

No. 5.—CHANGE FRONT THREE-QUARTERS, HALF, OR QUARTER RIGHT, FOR ACTION ON CENTRE GUN, (No. 2.)

Commanding officer.

Change front Three Quarters, Half, or Quarter Right for Action on Centre Gun, [No. 2]

Officers.

No. 1.

Of No. 1, Run back—
If ground permits—
Halt—Action front—
With—Load—Fire.

Of No. 2, Trail three
Quarters, Half, or
Quarter Left, for Ac-
tion—With—Load—
Fire.

Of No. 3, Run up—
If ground permits—
Halt, etc.

Of No. 4, Cease firing—
Front limber up—
Walk—March—Left
shoulders, etc.

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No. 1.

Trail three
half, or
left for action
Load--Fire.
2, Run up--
Action front--
Load--Fire.
Cease firing--
limber up--
March--Left
s--Halt--
front--With--
Fire.
Cease firing
limber up
March--
limber--Halt
front--With
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Load--

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PART I. SEC. II.

No. 6.--CHANGE FRONT RIGHT, THREE QUARTERS, HALF, OR QUARTER, RIGHT BACK, FOR ACTION.

Commanding officer.

Change front right,
Three quarter, half,
or quarter, back for
Action.

Officers.

Of Right Division--
Cease firing--Rear
limber up--Walk--
March.

No. 1.

Of No. 1, Cease firing--
Rear limber up--
Walk--March--Left
shoulders--Halt--
Action rear--With--
Load

Of No. 2, do
Of No. 3, Run back--
Halt--Action front--
With--Load--Fire--
if ground permits--
Cease firing--Rear
limber up--Walk
March--Left should-
ers--Halt--Action
rear--With--Load--
Fire.

Of No. 4, Action right
or trail the quarters
half or quarter left--
With--Load--(when
front is clear,)--Fire.

Change front left, three-quarter, half, or quarter left, or left back for
action, are the same in principle as those before detailed.

The Junior subaltern dresses the guns in these changes from the
base gun, being careful never to ride across the front of guns in ac-
tion, when taking up points.

The Serjeant-major dresses the limbers, which conform to the
movements of the guns, covering them correctly for drill purposes,
where accuracy is required to teach precision, obtaining cover
is the main point in fighting positions, or such as are meant to
represent fighting positions.

No. 7.--FROM LINE TO ADVANCE.

Commanding Officer.

Battery will advance--
Walk, March.

Officers.

Nos. 1.

When advancing in line, the No. 1 of the subdivision of direction
will take up points on which to march, extending his sword arm to
the front, that he may be known to the other Nos. 1 who take
their intervals from, and dressing by him; when the advance is
continuous he may be directed to drop his sword arm.

No. 8.—FROM LINE TO RETIRE.

Commanding Officer.	Officers.	Nos. 1.
<i>Left Reverse—Walk, March</i>		

Officers and staff serjeants turn about on their own ground. Nos. 1 turn about with their subdivisions.
The subaltern officers remain between their guns.

No. 9.—FROM LINE TO TAKE GROUND TO A FLANK.

Commanding Officer.	Officers.	Nos. 1.
<i>Right (or left) take ground—Walk, March.</i>		

At the word *March*, each carriage wheels—officers and staff serjeants shift to their places in column of subdivisions.

No. 10.—FROM LINE TO INCLINE.

Commanding Officer.	Officers.	Nos. 1.
<i>Right (or left) Incline—Walk, March.</i>		

At the word *March*, No. 1 subdivision must be careful to make the incline correctly; the lead driver of No. 2 dresses on the axletree of No. 1 gun, 15 paces distant; the lead driver of 3 dresses on the axletree of 2 gun, and so on.

Left Incline is done on the same principle.

To resume the original direction the word is *Forward*.

No. 11.—FROM LINE TO DIMINISH (OR INCREASE) INTERVALS ON THE MOVE.

Commanding Officer.	Officers.	Nos. 1.
(To diminish.) <i>Half (or Close) Interval on—Subdivision.</i>		<i>Right (or left) Incline—Trot—Forward—Walk (except No. 1 of the named Subdivision.)</i>
(To increase.) <i>Half (or Full) Interval on—Subdivision.</i>		

The commanding officer names the subdivision on which the formation is to be made.

No. 12.—IN LINE TO DIMINISH INTERVALS WITHOUT ADVANCING.

Should it be required to form diminished intervals from the halt, without advancing, the named subdivision stands fast, the remaining subdivisions reverse and come up at the required intervals.

No. 13.—FROM LINE TO ADVANCE IN COLUMN OF SUBDIVISIONS FROM A FLANK.

Commanding Officer.

Advance in Column of Subdivisions from the Right—Walk, March.

Officers.

Left Division—
Right take ground.

No. 1.

Of 1—Forward—
Of 2.—Right take ground—Left Wheel.
Of 3 and 4 in succession—Left Wheel—Forward.

No. 1 advances, the remainder take ground to the right, and wheel when in rear of No. 1.

No. 14.—FROM LINE TO ADVANCE IN COLUMN OF DIVISIONS FROM A FLANK.

Commanding Officer.

Advance in Column of Divisions—from the Right—Walk, March.

Officers.

Of Right Division—
Forward
Of Left Division—
Right take Ground—Left take Ground.

No. 1.

At the word *March*, the right division advances, and the left division takes ground to the right; and, when it arrives in rear of the right division, takes ground to the front.

No. 15.—FROM LINE TO ADVANCE IN ECHELLOX OF SUBDIVISIONS FROM A FLANK.

Commanding Officer.

Advance in Echelon of Subdivisions—From the Right—Walk—March.

Officers.

Nos. 1.

In succession—
Forward—Walk—March.

At the word *March*, No. 1 subdivision advances; the other subdivisions in succession, at subdivision distance.

A battery in echelon of subdivisions, if required to change its front for action, or when in action, does so at the words *Action Left*, (or *Right*), or *half, left or right*. *Action half left or right* is done on the same principle as *action left or right*, by throwing the trails round, and bringing the guns into the new direction; the limbers forming in rear of their guns.

NO. 16.—FROM LINE TO ADVANCE IN ÉCHELLOŶ OF DIVISIONS
FROM A FLANK.

Commanding Officer.	Officers.	Nos. 1.
<i>Advance in Echelon of Divisions from the Right—Walk—March</i>	(In succession) <i>Forward—Walk—March</i>	---

At the word *March*, the right division advances; the left at division distance. The battery can come into action in any direction by the previous wheel or half wheel of divisions.

NO. 17.—FROM LINE TO ADVANCE IN DOUBLE COLUMN OF SUBDIVISIONS FROM THE CENTRE.

Commanding officer.	Officers.	No. 1.
<i>Advance in Double Column of Subdivisions from the Centre—Walk—March.</i>	---	Of 2 and 3 Subdivisions— <i>Forward</i> . Of No. 1— <i>Left take ground—Right take ground.</i> Of No. 4— <i>Right take ground—Left take ground.</i>

At the word *March*, the two centre subdivisions advance, and the remainder take ground inwards.

As Nos. 1 and 4 come in rear of the column, they take ground to the front, by word of command from their Nos. 1.

The staff serjeants in rear of guns 1 and 4; the junior subaltern in rear of the centre.

If it is intended to form line to the right, the commanding officer gives the word *Right directs*.

These movements 13, 14, 15, 16, 17 and 18, can be performed on the move in a similar manner, the leading subdivision or division advancing at a steady trot, those in rear trot out.

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PART I. SEC. II.

No. 18. FROM LINE TO RETIRE IN COLUMN OF DIVISIONS FROM A FLANK.

Commanding Officer.	Officers.
<i>Retire in Column of Divisions from the Right--Walk--March</i>	Of Right Division-- <i>Right Reverse.</i> Of Left Division-- <i>Right take ground-- Right take ground.</i>

Nos. 1.

At the word *March*, the named division reverses to the right and proceeds to the rear; the other division takes ground towards the named flank, and then to the rear following the retiring division. To retire from the left, is the converse.

No. 19. FROM LINE TO RETIRE BY ALTERNATE DIVISIONS IN ACTION FROM A FLANK.

When a battery in line, in action, is ordered to retire from a flank by alternate divisions, the whole of the limbers come up and reverse as for limbering up to the rear, the named division limbers up at once and retires on its marker, who will have taken up any distance that may be ordered in rear of its inward flank, the other division remains in action, the limbers four yards from the trails ready to limber up, and retire as soon as the named division is halted for action.

The senior officer of each division gives the word of command. When the command *From line* is given, line is formed on the division leading the retirement, the limbers of which at once take their usual position in action.

If the division to retire is not specified, the left retires, boxes are not to be opened for each round, when so close to the guns, but two or three cartridges placed in one of the axle tree boxes are to be used.

No. 23.—IN LINE TO CHANGE FRONT TO THE REAR.

Commanding Officer,
*Change front to the
Rear on the centre by
Inwards about Wheel.*
(when reversed)--
*Eyes centre --- For-
ward--Walk--March*

Officers.

No. 1.

- Np. 1 *Left Wheel.*
4 *Right Wheel.*
2 *Left Wheel.*
3 *Right Wheel.*

When the movement is done from the halt, the quartermaster-serjeant places himself subdivision distance in rear of No. 3; the

serjeant-major takes up a distant point where the 1st. flank will rest, when the new formation is complete. The junior subaltern dresses the markers from the right of the serjeant-major.

At the word *March*, Nos. 1 and 3 advance four yards, and wheel inwards, bridle-hand to bridle-hand; 2 and 3 also wheel inwards, pass each other by subdivisions bridle-hand to bridle-hand. The whole move up into line by the gun of direction (No 3).

**No. 21.—IN LINE TO CHANGE FRONT TO THE REAR WHEN
AT DIMINISHED INTERVALS.**

Commanding officer.	Officers.	No. 1.
<i>Change front to Rear on the Centre---Left Half Battery Halt---</i>	<i>Right Half Battery--Left Wheel--Left</i>	
<i>Half Batteries Inwards about Wheel</i>	<i>Wheel--Forward.</i>	
<i>Forward --- Eyes Centre.</i>	<i>Left Half Battery--Right Wheel--Forward.</i>	

On the move the markers do not go out.

As soon as the word of command is given, the left half battery halts; the right moves forward, and as soon as it is sufficiently advanced to enable the left half battery to wheel, the whole wheel about inwards, and incline to the centre, the right half battery coming up at an increased pace.

If this is done from a halt, the serjeant-major places himself in rear of No. 3 gun, the 3rd subaltern in rear of him. After wheeling about, No. 3 subdivision marches on the serjeant-major, and the battery is halted when it comes up to him.

A battery at diminished intervals may also change front to the rear on the centre, and open out to full intervals in wheeling; the word of command is—

Change Front to Rear, Full interval on No. --- Left Half Battery Halt. Half Batteries Inwards about Wheel---Forward---Eyes centre.

The right half battery moves forward as in the former case, and, in wheeling, the subdivisions open out to full interval from the one named.

**No. 22.—TO REVERSE A BATTERY IN LINE WHEN AT DIMINISHED
INTERVALS.**

Commanding Officer.	Officers.	Nos.
<i>Battery will reverse--</i>		
<i>Words-- March.</i>		<i>1 and 3--Left Reverse</i>
<i>Left reverse --- Eyes Centre.</i>		<i>---Forward--Halt.</i>
		<i>Of 2 and 4--Left Reverse--Halt--Dress.</i>

When this is done on the move, the left subdivisions walk, and the right trot, when clear the whole reverse.

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IN LINE LIMBERED UP, CHANGING FRONT.

Changing front when limbered up, *right, left, three-quarters, half, or right or left back*, is done on the same principle as for action, except that of course no guns are run up by hand.

On the same principle the word *right or left shoulders* should be given instead of *left or half left, or right* for all changes of front less than a quarter circle, so as to move on the arc and come up square.

NO. 23.—IN LINE LIMBERED UP TO CHANGE FRONT ON A FLANK SUBDIVISION.

Commanding officer.	Officers.	No. 1.
<i>Change front to the Left--Walk--March.</i>	Of Right Division— Subdivisions half left.	Of 1 and 2-- <i>Half Left</i> -- <i>Left--Halt--Dress.</i> Of 3-- <i>Forward--Left</i> take ground-- <i>Halt--Dress.</i> Of 4-- <i>Right take</i> ground-- <i>Right Re-</i> verse-- <i>Halt--Dress.</i>

The marker of the left subdivision marks with his horse's head close to the head of his No. 1's horse; the others for their respective subdivisions. When there are no markers, the sergeant-major marks for No. 1, quarter-master-sergeant for No. 4; being dressed by the junior subaltern.

As a general rule reverse are inwards in these formations, as there may not be room to an outward flank.

At the word *March*, the left subdivision *Right take ground*, *Right reverse*, and moves up to its marker; the others advance, wheel half left, and left towards the formation, and halt when in line.

NO. 24.—IN LINE LIMBERED UP TO CHANGE FRONT RIGHT BACK.

Commanding Officer	Officers.	No. 1.
<i>Change front Right, Back--Walk--March.</i>	Of Right Division-- Left Reverse--Sub- divisions Half Right --Forward.	Of 1 and 2-- <i>Left Re-</i> verse-- <i>Half Right--</i> Forward-- <i>Left Re-</i> verse-- <i>Halt--Dress.</i> Of 3-- <i>Left Reverse--</i> Right take ground-- Left Reverse-- <i>Halt</i> -- <i>Dress.</i> Of 4-- <i>Left take ground</i> -- <i>Left Reverse--Halt</i> Dress.

The word *Dress* follows *Halt*, when the formations are on markers, though artillery cannot dress back; they should halt a pace or two short, when accuracy of alignment is necessary.

No. 25.—IN LINE LIMBERED UP TO CHANGE FRONT LEFT BACK.

Commanding Officer.	Officers.	No. 1.
<i>Change Front Left Back—Walk—March</i>	Left Division—Right Reverse. Subdivisions—Half Left —Forward.	Of 1—Forward—Right take ground—Right Reverse—Halt. Of 2—Right Reverse— Left take ground— Left Reverse. Of 3 and 4—Right Re- verse—Half Left— Forward—Left Re- verse—Halt—Dress.

No. 26.—IN LINE LIMBERED UP TO CHANGE FRONT ON A CENTRAL
SUBDIVISION.

Commanding Officer.	Officers.	No. 1.
<i>Change Front to the Left on No. 3—Walk— March.</i>		Of 1—Half Left—Left Forward—Halt— Dress. Of 2—Forward—Left take ground—Halt— Dress. Of 3—Right take ground—Right Re- verse—Halt—Dress. Of 4—Right Reverse— Left take ground— Right Reverse—Halt— Dress.

In changing front on a central subdivision, the longest flank should be thrown forward if possible—thus change of front to the right should be made on No. 2; to the left on No. 3.

These manœuvres can be executed on the same principle by divisions.

A battery can also change front on a moveable pivot by a simple wheel.

No. 27.—IN LINE LIMBERED UP TO CHANGE FRONT FOR ACTION.

Commanding Officer.	Officers.	No. 1.
<i>Change Front Right Back for Action— March.</i>	<i>Of Right Division— Left Reverse—Subdi- visions—Half Right —Forward.</i>	<i>Of 4—Action Right. Of 3—Left Reverse— Right take ground— Halt—Action rear Of 2 and 1—Left Re- verse—Half Right— Forward—Halt—Ac- tion rear.</i>

At the caution the left sub division comes into action in the new direction; at the word *March*, the others proceed as in No. 24, and come into action to the rear, when their gun axle-trees are on the alignment.

Change front right or left back, quarter left back; three quarters half, can be done on the same principle.

No. 28.—FROM LINE—A BATTERY IN ECHELLOON OF DIVISIONS TO CHANGE ITS FRONT WHEN IN ACTION.

Commanding Officer.	Officers.	No. 1.
<i>Change Front to the Left, on the Left Guns of Divisions—March.</i>		<i>Of 2 and 4—Action Left. Of 1 and 3—Run up.</i>

At the caution the pivot guns are turned into the new direction, and at the word *March*, the others, if the ground will permit, are run into position by hand.

The guns will not be limbered up if they can be run into position by hand.

Retirements in echelon, are done on the same principle as the advance.

No. 29.—FROM LINE TO CHANGE POSITION TO A FLANK.

Commanding Officer.	Officers.	No. 1.
<i>Change Position by the Oblique Echelon of Divisions to the Right — Walk — March — Form Line.</i>	<i>Half Right—Forward— Right—Forward— Halt—Dress.</i>	

At the word *March* the divisions wheel half right, and advance until the word *Form Line* is given.

The commanding officer gives the words *Form Line* when the echelon has arrived at 20 paces from the intended position.

The markers *i.e.* sergeant-major and quartermaster-sergeant, under the 3rd subaltern, move out at the words *Form Line*, or before if directed, and mark the line at right angles to the original position, or at such place and angle as may be ordered, allowing 30 paces for the right division to wheel up square. The officer of the right division gives the word *Right* to his division, and halts it on the alignment.

The other division receives the word *Right* as soon as its right is uncovered from the division in front, and come up in succession in to line.

It must be borne in mind that subdivisonal markers do not go out for formations for action. The 3rd subaltern and two staff-Sergts. perform this duty on service, with sextant, or such range-finder as might be supplied; if there is no instrument, they assist the commanding officer to the best of their judgment to ascertain the distance of the enemy.

No. 3).--FROM LINE TO CHANGE POSITION BY THROWING BACK A FLANK.

Commanding Officer.	Officers.	No. 1.
<i>Change Position by the</i>	<i>Left Reverse--Forward</i>	
<i>Oblique Echellon of</i>	<i>--Left Reverse.</i>	
<i>Divisions Right Back</i>		
<i>---Left Reverse---</i>		
<i>Walk --- March ---</i>		
<i>Form Line.</i>		

The battery having reversed, the movement is performed as in changing position to the right, except that each division, after completing the wheel at the word *Right*, passes the new alignment, and when sufficiently to the rear reverses to the right; or if for action, comes into action rear, as soon as the gun axles are on the new alignment.

NOTE.--Changes of position may be made three-quarters, half right, or quarter, in the same manner; the divisions forming oblique echellon by wheeling quarter right. To complete the wheel in forming line the word is *Right*. The same done by oblique of subdivisions.

No. 3L.--IN LINE TO FORM COLUMN OF DIVISIONS IN REAR OF A FLANK.

Commanding Officer.	Officers.	No. 1.
<i>Column of Divisions in</i>	<i>Of Left Division --</i>	
<i>Rear of the Right--</i>	<i>Right Reverse--Eyes</i>	
<i>Walk--March,</i>	<i>Left --- Left Take</i>	
	<i>Ground--Left Take</i>	
	<i>Ground--Eyes Left</i>	
	<i>--Halt.</i>	

At the word *March*, the division that moves reverse to the right, and dress by the left; the left division, when sufficiently to the rear, takes ground towards the column (viz., to the left); the officer, when he sees the leaders of his rear subdivision on the line his division when in position.

In all formations, officers should be careful to give the word *eyes right, left or centre*, to their divisions, according to the position of the base.

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No. 32.--COLUMN OF DIVISIONS IN REAR OF THE LEFT.

Commanding officer.	Officer.	No. 1.
<i>Column of Divisions in Rear of Left--Walk --March.</i>	Right Division-- <i>Left Reverse--For- ward--Eyes right-- Right take Ground-- Right take Ground --Eyes right--Halt --Dress.</i>	

This movement can be done to the front or to either flank on the same principle, if required.

No. 33.--ADVANCING IN LINE CLOSE INTERVALS, LINE TO THE RIGHT OR LEFT FOR ACTION RIGHT OR LEFT.

Commanding Officer.	Officers.	No. 1.
<i>Line to the Right for Action Right.</i>	<i>Left Division Trot.</i>	Of 1--Halt--Action Right. Of 2--Left shoulder-- Forward--Halt--Ac- tion Right. Of 3--Half Right--For- ward--Walk--Halt-- Action right. Of 4--Half Right--For- ward--Walk--Halt-- Action Right.

The commanding officer of left division gives the command to his division to trot, the Nos. 1 taking command afterwards.

This movement requires good driving when done at the trot. It is not generally advisable to bring guns into action from close interval, but may be necessary from limited space, and a battery accustomed to work at close interval is very handy among other troops.

No. 34.--IN LINE TO BREAK INTO COLUMN OF DIVISIONS TO A FLANK.

Commanding Officer.	Officers.	No. 1.
<i>By Divisions--Right Wheel--Walk-- March.</i>	<i>Forward.</i>	

At the word *March*, the divisions wheel to the right. The column is readily formed thus on the move, and equally easily wheeled into line at the word *By Divisions Right or Left Wheel up*.

If, for convenience of ground or other reasons, it is desired to form a column of divisions, maintaining the pivot, the manœuvre may be performed as follows, from the *Halt*, but should never be so done on the move being a useless complication.

Commanding officer.

Break into Column of Divisions to the Right -- Walk -- March.

Officers.

No. 1.

Of 1 and 3--*Left reverse -- Right Wheel -- Right reverse-- Halt-- Dress.*

Of 2 and 4--*Left take ground--Left reverse --Halt--Dress.*

MOVEMENTS FROM COLUMN.

No. 35.--FROM COLUMN OF ROUTE TO FORM COLUMN OF DIVISIONS.

Commanding Officer.

Form Divisions-- Walk --March.

Officers.

No. 1.

Of 2--*Left take ground --Right take ground --Halt--Dress.*

Of 4--*Left take ground --Right take ground --Halt--Dress.*

No. 2 and 4 take ground to the left and then to the front. If the command is *On the Right Form Divisions*, the subdivisions form on the right.

If this is done on the move, the rear subdivisions will incline, and at an increased pace form divisions.

No. 36.--FROM COLUMN OF DIVISIONS TO ADVANCE IN COLUMN OF ROUTE.

Commanding Officer.

Column of Route from the Right--- Walk--- March.

Officers.

No. 1.

Of 1 and 3--(in succession)--*Forward.*
Of 2 and 4--(in succession)--*Right take ground--Left take ground.*

If this is done on the move, No. 1 advances at an increased pace, and is followed by the others in succession, inclining.

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NO. 37—FROM COLUMN OF DIVISIONS TO WHEEL INTO LINE.

This is a simple wheel by divisions on a moving pivot, the word of command being *By Divisions Right or Left Wheel up*, but when done at a *Halt* on a fixed pivot so as to form on a fixed alignment, it is as follows:

Commanding Officer.

Right (or Left) Wheel
into Line—Walk—
March.

Officers.

No. 1.

Of 1 and 3—Left
Wheel—Halt—Dress.
Of 2 & 4—Right Wheel*
—Forward—Right
about Wheel—For-
ward—Halt—Dress.

At the caution, the officers commanding divisions move to their position on and facing the alignment; at the word *Eyes Front* they turn to the right about and fall in between their subdivisions.

The markers mark for the flank subdivisions in the new line, the 2d subaltern dressing them from the outer flank of the serjeant-major.

At the word *March*, the outer subdivisions wheel up into their places. In order to do this correctly, the drivers must break away to the rear of the intended line, so as to come up square. The pivot subdivisions wheel to the right, and when sufficiently to the rear, wheel about and come up to their positions.

This may be done to the right in the same manner.

NO. 38—FROM COLUMN OF DIVISIONS TO FORM LINE ON THE LEADING DIVISION.

Commanding Officer.

Left or Right of the
Front Form Line—
Walk—March.

Officers.

Of Left Division—Left
take ground—Right
take ground—Eyes
right—Halt—Dress.

No. 1.

At the caution the markers takes up the alignment.

At the word *March*, rear division takes ground to the left.

The officer of the left division, as soon as his rear subdivision is opposite its position, gives the word *Right take ground*, and *Halt*, *Dress*, as his division comes up into line.

If *On the Move*, the left division inclines towards the intended line, and come up at an increased pace.

* For the pivot guns the commands *Right take ground*, *Right reverse*, would answer. The word *wheel* is given in case the wagons were on parade this being strictly a parade movement, and never used in manœuvre or on the move.

Line may be formed to the right in the same manner.

When for *Action*, the leading division comes into action at the word *March*. The rear division proceeds as before, and come into action when in position, dressing on the axes of the guns already in action.

No. 39—FROM COLUMN OF DIVISIONS TO FORM LINE ON THE
REAR DIVISION.

Commanding Officer.	Officers.	No. 1.
<i>Form Line on the Rear Division — Walk — March.</i>	Of Right Division— <i>Right take ground—</i> <i>Right take ground—</i> <i>Eyes right—Left Reverse — Eyes left—</i> <i>Halt—Dress.</i>	

The base is given by the rear division.

At the word *March*, the right division takes ground to the right. The officer of the right division, as soon as he sees the limber of his rear gun opposite its position, gives the word *Right Take Ground—Eyes right*. The officer, as it goes to the rear, halts on the alignment, and as soon as the division is sufficiently to the rear gives the word *Left Reverse—Eyes left*. He halts it when in line, and turns right about.

Line may be formed on the left of the rear division in a similar manner, the word of command being *Form Line on Left of Rear Division*.

No. 40—FROM COLUMN OF DIVISIONS TO FORM LINE TO THE
REAR ON THE REAR DIVISION.

Commanding officer.	Officers.	No. 1.
<i>Line to the Rear on the Rear Division—Walk — March.</i>	Of Right or Leading Division— <i>Left wheel — Forward—Eyes left — Left wheel — Forward — Eyes left — Halt—Dress.</i> Of rear division— <i>Subdivisions Inwards about wheel — Forward—Eyes Right — Halt—Dress.</i>	

If executed from the *Halt*, markers take up the alignment subdivision distance in rear of the base division to give it space to get square after the *Inwards about wheel*. But if on the move as it is usually done, markers do not move out, the officer of the leading division gives the word *Trot*, after the word *March* from the Commanding officer.

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NO. 41.—RETIRING IN COLUMN OF DIVISIONS TO FORM LINE ON THE LEADING DIVISION FOR ACTION REAR.

Commanding officer.	Officers.	No. 1.
<i>On the Right of the Leading Division, Form Line for Ac- tion Rear—March.</i>	Of Leading Division— <i>Halt—Action Rear.</i> Of Right Division— <i>Right take ground— Left take ground— Eyes left—Halt—Ac- tion Rear.</i>	

NO. 42.—CHANGING THE ORDER OF A COLUMN.

Should it be necessary to change the order of a column, the rear subdivision or division inclines to the right, or left, as ordered, and when clear of the column moves to the front, followed by the rest in succession.

The word of command is *Rear subdivision or division to the front*, or it may be *Rear division to the front, through the intervals*, the rear subdivisions incline inwards opening out when clear in front.

NO. 43.—TO COUNTERMARCH A COLUMN OF DIVISIONS.

Commanding Officer.	Officers.	No. 1.
<i>Divisions will Counter- march--Walk--March.</i>	<i>Subdivisions Inwards About Wheel—For- ward—Halt.</i>	

The base is given as for column.
At the word *March*, the divisions wheel about inwards by subdivisions, and halt.

Officers turn right about and halt their divisions,
On the Move.—The divisions wheel about inwards by subdivisions, bridle hand to bridle hand, and move forward without halting.

NO. 44.—ADVANCING BY DOUBLE COLUMN OF SUBDIVISIONS FROM THE CENTRE—RIGHT AND LEFT OF THE FRONT FORM LINE.

Commanding Officer.	Officers.	No. 1.
<i>Right and Left of the Front form Line.</i>		Of 1 <i>Half right--For- ward.</i> Of 4 <i>Half left--For- ward.</i>

On the move the rear subdivisions trot up,

No. 45.—ADVANCING IN DOUBLE COLUMN OF SUBDIVISIONS FROM THE CENTRE, LINE RIGHT OR LEFT FOR ACTION.

Commanding Officer.

Officers.

No. 1.

Line right (or left) for action.

Right Division---Halt
--Action right.
Left Division---For-
ward---Trot.

Of 3 Right take ground
Walk--Halt--Action
front.
Of 4 Right take ground
Walk--Halt--Action
front.

No. 46.—FROM COLUMN OF DIVISIONS OR SUBDIVISIONS LINE RIGHT OR LEFT ON THE LEADING DIVISION OR SUBDIVISION FOR ACTION.

Commanding Officer.

Officers.

No. 1.

Line right on the leading division for action.

Right Division--Right
wheel--Halt--Action
front.
Left Division---For-
ward---Trot--Right
wheel--Walk--Halt--
Action front.

The officer commanding leading division, wheels his division to the right or left at once, and when square, halts and comes into action front at once. Officer of rear division advances at the trot, then wheels to his right or left, and when in line with right division, halts and action front: if this is done by subdivisions, the leading subdivision wheels to its right at once and advances its depth, then halts and action front, the rear subdivisions come up at a trot in succession and halt, action front opening fire in succession.

No. 47.—A BATTERY IN LINE IN ACTION AS A REAR GUARD DEFENDING A BRIDGE OR DEFILE, RETIRING FROM BOTH FLANKS ALTERNATELY.

Commanding Officer.

Officers.

No. 1.

Battery will retire from both flanks alternately in rear of centre, and reform line for action.

Of 1 Action--Rear lim-
ber up--Half right--
Left wheel--Left wheel
--Halt--Action left.
Of 4 Rear limber up--
Half left --- Right
wheel--Right wheel--
Halt--Action right.
Of 2 and 3 Action--Rear
limber up--Right and
Left shoulder--Right
and left shoulder--
Halt--Action right
and left.

If the subdivision to retire is not specified, left retires first then right and so on in succession, the centre continuing in action to cover the retirement.

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INSPECTION OF A BATTERY.

The battery is formed up in line limbered up detachments rear.

Battery at order, viz: the subalterns one horse's length in front of the centre of their divisions, the third subaltern in the centre of the battery in line with other subalterns, surgeon and veterinary-surgeon, one horse's length on the right of the leaders of the guns.

The trumpeters one horse's length on the right of the whole, in line with the leaders of the guns.

The commanding officer in the centre, a horse's length in front of the subalterns.

The sergeant-major in rear of No. 1 subdivision, the quarter-master sergeant in rear of No. 4 subdivision.

As the inspecting officer arrives, the commanding officer gives the word *General Salute, Eyes Center, Draw Swords*, officers and mounted non-commissioned officers draw swords, the officers coming down to the last motion of the salute. The officers recover swords, and carry, taking the time from the commanding officer.

The commanding officer accompanies the inspecting officer, and the whole remain steady while he makes his inspection.

No. 1 of each subdivision will give the word *Eyes Right* to his subdivision on the arrival of the inspecting officer, and *Eyes Front* when he has passed. As soon as the inspection has been made, the commanding officer gives the word *Slope Swords*.

When the caution is given to march past, the third subaltern or sergeant-major places points to march past on:

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Passing line.

Parade line.

A Battery to March Past in Line Close Interval.

At the word *March* the battery takes ground to the right when the head of the column arrives at the first wheeling point, the commanding officer gives the word *Left wheel*, and at the second wheeling point *Left take ground close interval* on No. 1 upon which the rear subdivisions incline to their right after taking ground, and move up to close interval, subalterns advancing one horse's length to the front of their division.

On arriving at the open order point, forty paces from the inspecting officer, the officer commanding gives the word *Take order, Carry swords, Eyes right*, the drivers salute and look to the right at ten paces from the inspecting officer, the officers salute, subalterns taking time from the commanding officer, who is one horse's length in front.

As soon as the commanding officer has passed the inspecting officer, he places himself on his right and carries his sword, at ten paces past the inspecting officer, the subalterns carry swords.

When the rear of the battery has passed the inspecting officer, the commanding officer rejoins his battery, fifty paces from the inspecting officer, he gives the word *Slope swords, Close order*, upon which the drivers throw back their whips.

The sergeant-major marches past in rear of No. 1 subdivision, quartermaster sergeant in rear of No. 4 subdivision, trumpeters ten paces in front of the commanding officer, third subaltern in rear of the whole, at the third wheeling point, commanding officer gives the word *Left wheel, and Halt* when in line with the saluting point.

TROT PAST.

Commanding officer gives the word *Battery will trot past. Gunners prepare to mount, Mount, Walk, March*, when at first wheeling point, *Left wheel, Trot*, when the battery arrives at its own depth from the second wheeling point, *Left wheel, Eyes right*, when at the open order point, gives the word *Eyes right, Carry swords*. Spare carriages do not trot past.

GALLOP PAST.

To gallop past, when the battery arrives at the third wheeling point, the commanding officer gives the word *Inwards about wheel, then Halt, The Battery will gallop past, Walk, March, Trot, Gallop, Eyes left, Carry swords*.

In galloping or trotting past, the pace should be that of the slowest horse.

To preserve a good line, the pace should not be altered and especially should not be checked; it is better to pass too fast than to have a fluctuating line, guns can neither increase nor check their pace very suddenly, and mounted men in line take up a change in dressing in succession, and exaggerate it; it takes a considerable extent of ground to recover dressing once lost. If a commander finds his battery coming on him too fast, it is better for him to use his spurs keep well ahead, and find fault with the subaltern on the pivot flank afterwards. A decided gallop is necessary to prevent the horses in the guns from trotting, a slow canter being a pace quite unsuited to horses in draught, and a steady trot is necessary to prevent horses from cantering. Wheeling in line at a gallop should be avoided, as the outward flank guns have to move on an arc, and at the same time go at a pace not desirable from partially trained batteries.

While considering the momentum of a battery at a gallop, one is naturally reminded of the occasion in the Peninsular war, in which a troop of Horse Artillery, under the command of Major Norman Ramsay forced their way through a large body of French heavy Cavalry.

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CLEANING AND PRESERVATION OF HARNESS.

When the harness is taken off the horses the iron work should be wiped dry, and an oiled rag passed over it to prevent rust; * the mud and sweat should be sponged off, and the harness hung up for subsequent cleaning; it should not be left hanging in stables where it may be knocked off the pegs and trampled on by the horses, nor should it be kept permanently in stables, where the steam from the horses, especially in winter, has an injurious effect; the harness rooms should be dry with an even temperature. In the dry climate of Lower Canada, especially during winter, if exposed to stove heat, a good deal of oil is sometimes necessary to soften harness that has become too dry, but it darkens it and prevents it taking a polish for some time.

Leather is best preserved and cleaned with soft soap, but the following have frequently been employed.

Hard soap and beeswax, which gives a good polish, and is perhaps as good as anything.

White wax and turpentine, which gives a beautiful polish, but dries up and ruins the harness.

White of egg, which looks well in dry weather, but gets into a lather in wet.

Dubbing † should be applied warm, and allowed to soak into leather work which has become dry and hard, and sometimes brittle; it has a remarkably good effect, the harness will not take a good polish after it, until the surface gets a little dry. Loose keepers should be stitched in their proper places.

To enable iron work to be kept really clean, it should be filed and burnished with chain burnishers, the collar chains shaken in a bag; but there are more important duties than burnishing to be learnt by Militia in the short time allotted; it is, therefore, sufficient to keep iron work oiled and free from rust; the process of case hardening or blueing, might advantageously be resorted to.

* FOOT NOTE.—Coal oil is good for removing rust, but it should not be left for any length of time on iron work.

† A preparation rendering the harness both pliable and proof against rats, &c. It is put on with a brush after being heated to the necessary consistency; more being applied to the inside than the outside of the leather.

RECIPT—As used by Quebec Squadron of Hussars:—

1 lb. Rosin

1 “ Bees-wax.

10 “ Mutton suet.

The above to be melted separately and then mixed with $\frac{1}{2}$ pint neatsfoot oil.

ACCIDENTS IN THE FIELD.

Space does not permit of dealing exhaustively with this subject; a few examples of accidents in the field may be found instructive.

The most common casualty in draught is to have a horse down. A leader can generally get up again easily unless his leg is over the trace, and even then he can sometimes do so. The best way to put this last matter right, when the horse is on his legs, is to slacken the trace as much as may be, pat and talk quietly to the horse and hold his head well up, while his trace is unhooked and replaced in its proper position.

But when any horse is down and does not at once rise, it is better to sit on his head and hold him firmly down till the harness is sufficiently undone to clear him. In the case of the shaft horse, both traces and breeching must be undone. If the horse is lying on the trace so that it can't be unhooked, unbuckle the hame strap, open the hames and so release the traces, it may be necessary to move the wheel an inch or two forward, and after unhooking run the carriage back so as to leave him lying clear on the ground with nothing to prevent his rising. It is rather difficult to keep the shafts from digging into him as they pass over him; they should be held up from the side towards which his back is turned to avoid his kicking.

If a gun wheel breaks and lets down the gun it will be found that the gun and carriage require a very heavy lift to raise them sufficiently to change the broken for a new wheel. The Fig. shows a way in which the team of the gun may be employed to do it without unhooking by simply unlimbering and fastening the prolong to the pintail and round the axle-tree bed of the broken wheel.

A gun or carriage may be capsized right over on to its wheels as in the Fig. The best way to repair this form of disaster would be to keep the wheel horses down, unhook them, run the carriage clear, get them up, unlimber the gun, reverse the limber by raising the shafts and the gun if not too long by raising the trail. A hole may be dug if necessary to let the muzzle enter it, especially if the gun is not completely capsized.

Disabled carriages are treated under the heads, mounting and dismounting field ordnance, use of prolongs, &c., page 65 and consecutive pages. If a shaft is broken, the gun may be driven curriele, that is, the remaining shaft must be put on the near side and a handspike lashed to it by means of a drag rope, at such a length as to support the shaft in about the usual position, when the handspike rests across the saddle and pad of the wheelers; the driver then sits on the limber between the gunners, and drives his horses with reins made up of Hambro' line.

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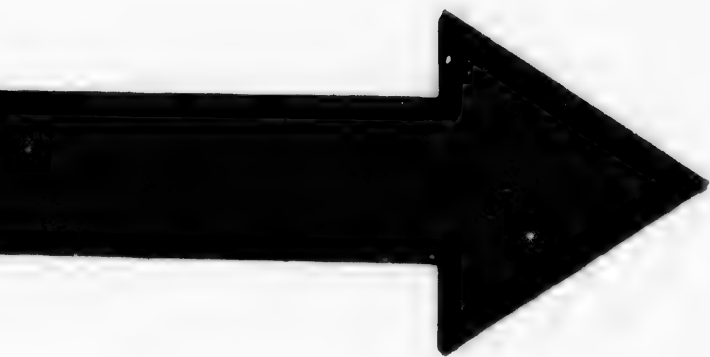
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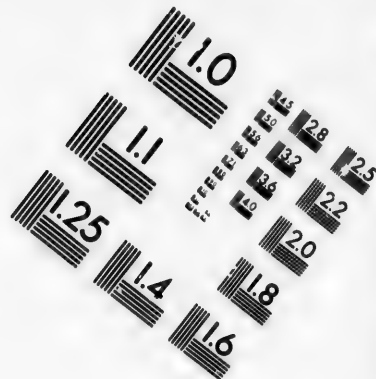
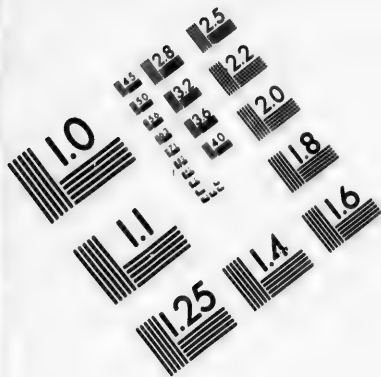
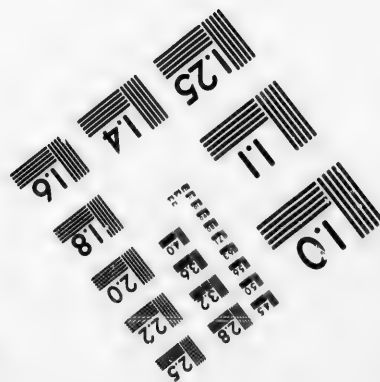
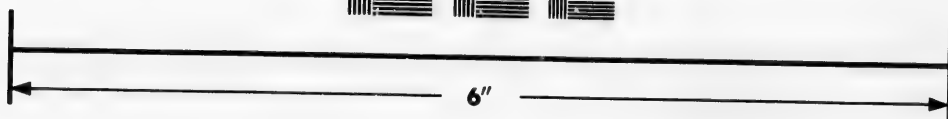
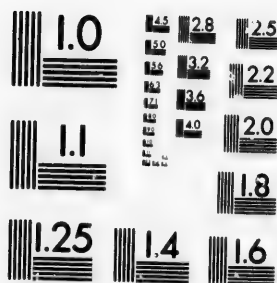


IMAGE EVALUATION TEST TARGET (MT-3)



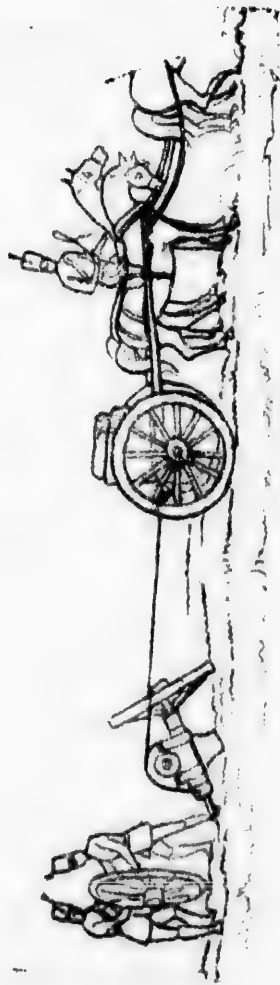
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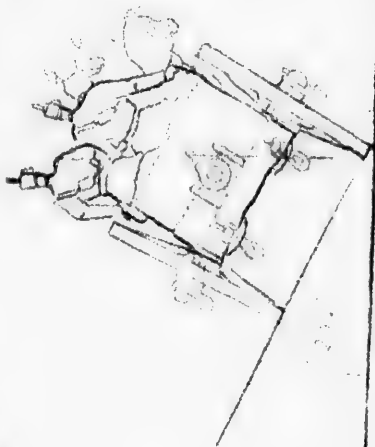
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UPSETTING ANGLE OF WHEELS.

The carriage being tilted over to the side will upset as soon as the centre of gravity has passed the vertical line through the lower wheel, as in the Fig. It may be seen that this occurs at a lower angle with a higher wheel.

In passing obstacles, unless time is of vital importance, the gunners should be dismounted, as it is less dangerous and lightens the weight.

The men on the gun axle seats are very rarely injured except by carelessly putting a leg or arm between the spokes. If thrown off, their feet are close to the ground, they are simply left behind without danger of being run over, except in a column of route. The danger to limber gunners is greater; they should be careful to hold on to the hand straps, and in passing rough ground to hold also the hand rail on the box, rising slightly from their seats and resting part of the weight on the feet, so as to take the jolts on the natural springs of the arms and legs instead of on the vertebral column.

ACCIDENTS TO MOUNTED MEN.

The accidents that may occur to mounted men are frequent, but simple in character, the great danger is that the carriages in rear may pass over a man on the ground and kill him; this, however, rarely happens, as the drivers generally have time to move clear. Horses seldom strike a man on the ground with their feet very severely.

A common cause of men riding against each other is from their not looking in front of them.

It may be observed that there is comparatively little danger of a battery, at full interval, riding into a body of men, as they have room to wheel by subdivisions up to the last moment.

Perhaps the most fatal class of accidents to mounted men is from horses rearing and falling back on them, this may occur from a young horse taking fright at firing; if opportunity is given, laying a hand or sword on the horse's head may prevent a horse from rearing. In any case the rider must not hold on to the curb rein, but if necessary take a lock of the mane in his hand and ease the reins in so doing.

A young horse taking fright and "bolting" or backing against a gun is dangerous; serious accidents have occasionally occurred of this kind.

A riding horse kicking over the trace of a gun has been thrown down; the remedy is to keep him down, slack the traces and unhook.

OBSTACLES.

The gunners should always dismount in passing serious obstacles. When time is an object, a ditch may be past in line at full intervals; otherwise, in column of route when the leading guns will break down the obstacle or diminish the steepness of the banks of a ditch or ravine. If there is time, a few minutes use of the intrenching tools carried on the limber will render most places passable. As a rule the team should be brought up quietly and the horses given their heads. It is sometimes necessary, but dangerous, to go at speed.

The gun may be unlimbered and the prolong used as in the Fig. For a short stiff pull up hill the weight of the men on the off horses is an advantage.

In short, in most places, where there is space for the axletrees, field guns can be brought by resolute men—and even at speed, Artillery have passed obstacles from which their Cavalry escorts have turned back.

PASSAGE OF RIVERS.

When embarking field guns in boats a few simple precautions have to be taken, such as not allowing the gangways, or embarking skids for guns to rest on the gangway, nor the bottom of the boat on the ground. If the boat is wide enough guns can best be run aboard on (with the boat end on) long skids with flanges on the inside to keep the wheels from running off.

When a river is too deep to be forded without wetting the ammunition boxes, they should be taken over in boats or on rafts easily constructed in a wooded country like Canada; cask rafts are available with every force carrying the necessaries of life, such as pork, flour, not to mention beer, spirits and coal oil casks, or a couple of canoes connected with a platform of timber will carry the gun itself.* The horses may be made to swim over as de-

* FOOT NOTE.—A 9 pr M. L. R. field gun with carriage, limber, ammunition, &c., complete, weight 35 cwt., say 3,500 lbs., Canadian measure. The flotation of a cask raft is easily ascertained by remembering that roughly a gallon of water weighs 10 lbs., or a cubic foot of water 60 lbs. If you are using then say the ordinary small casks of 30 gallons the flotation per cask would be 300 lbs. To leave a margin so as not to submerge casks, and allow for weight of superstructure; use, say 15 casks made into a raft supported by 3 rows of casks of 5 each. Leave the bung-holes up so as to pump. The whole raft is lashed, no nails are used, and has been found strong enough to allow the gun to be fired from it, the recoil being absorbed by the movement of the raft backward.

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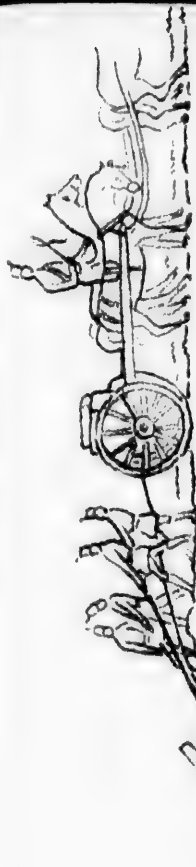
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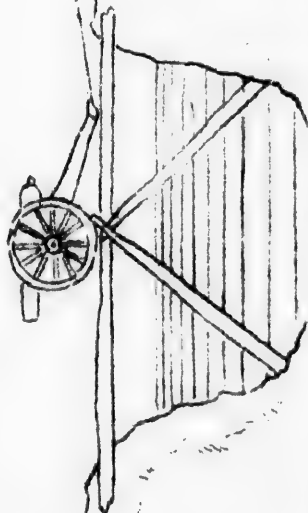
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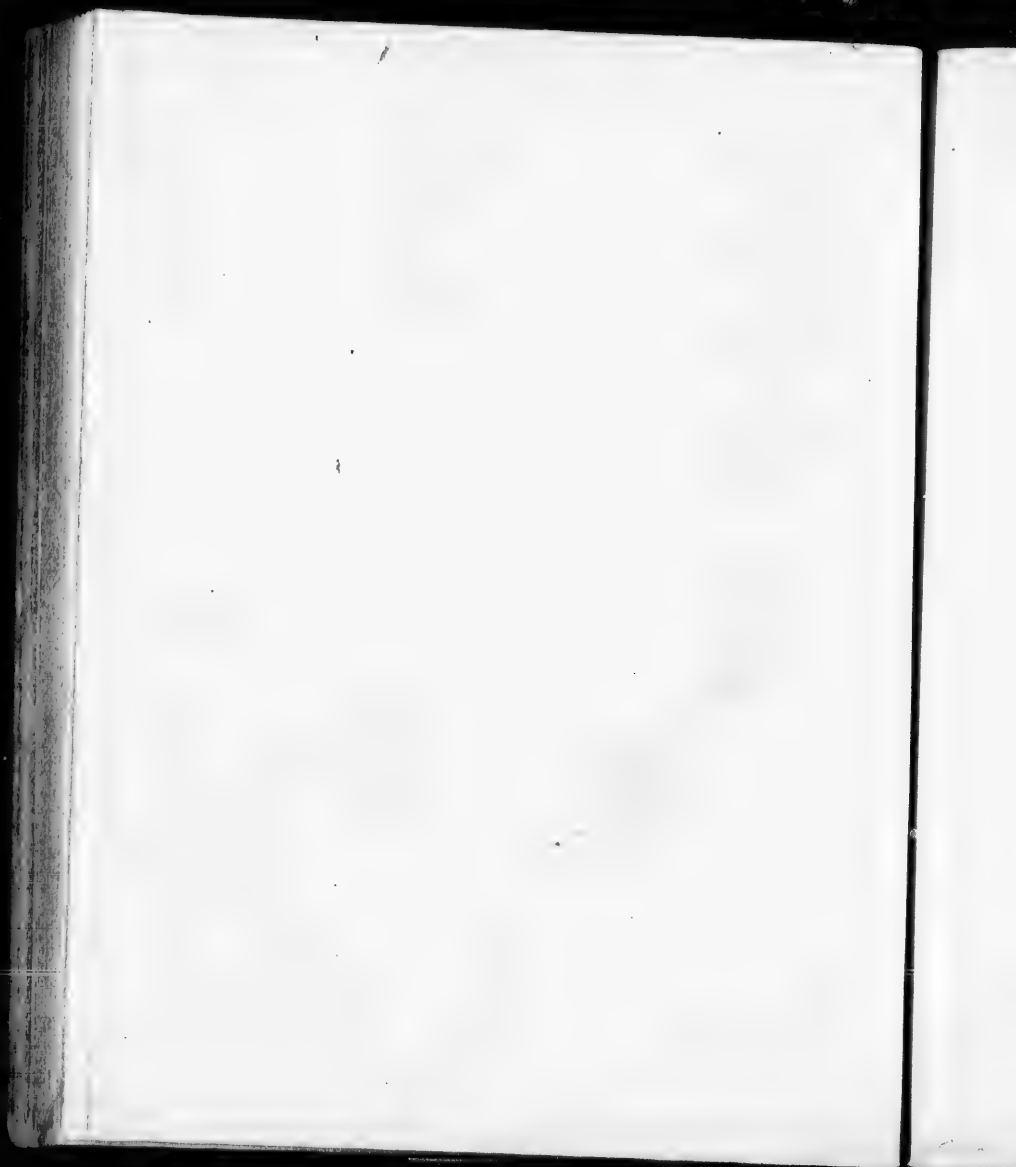
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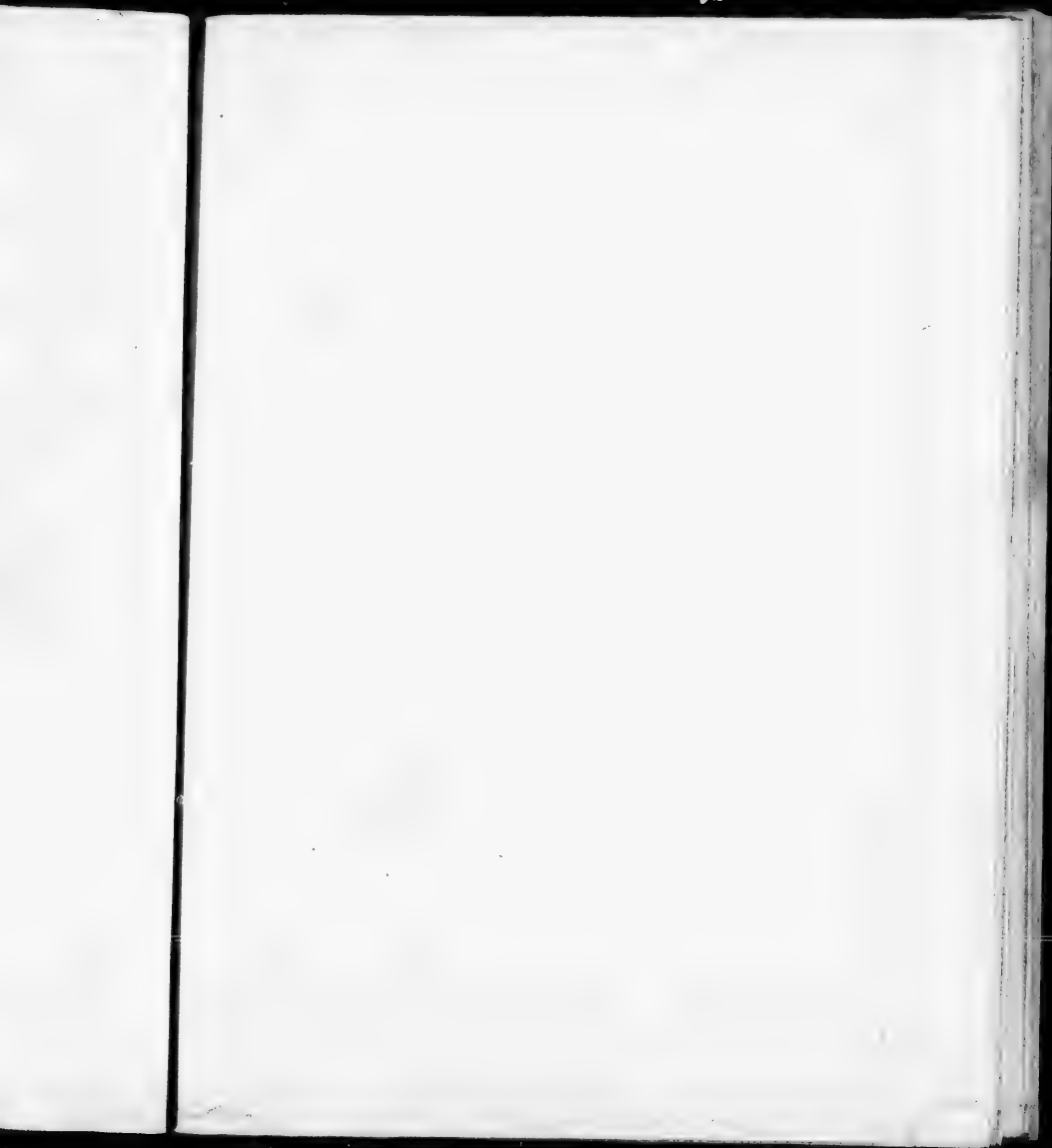
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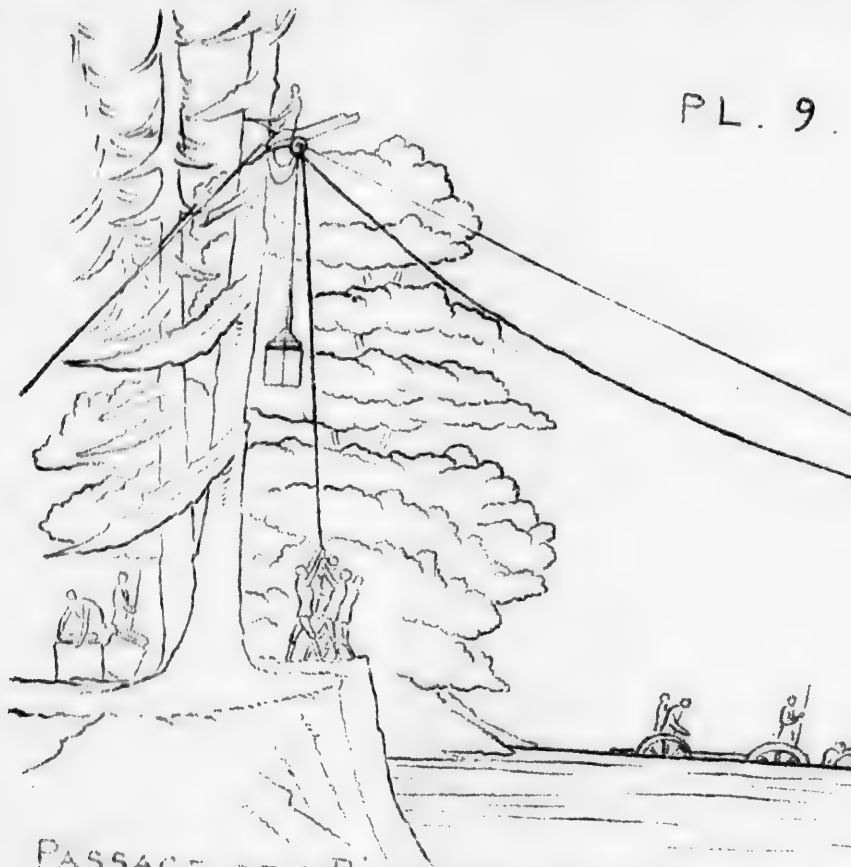
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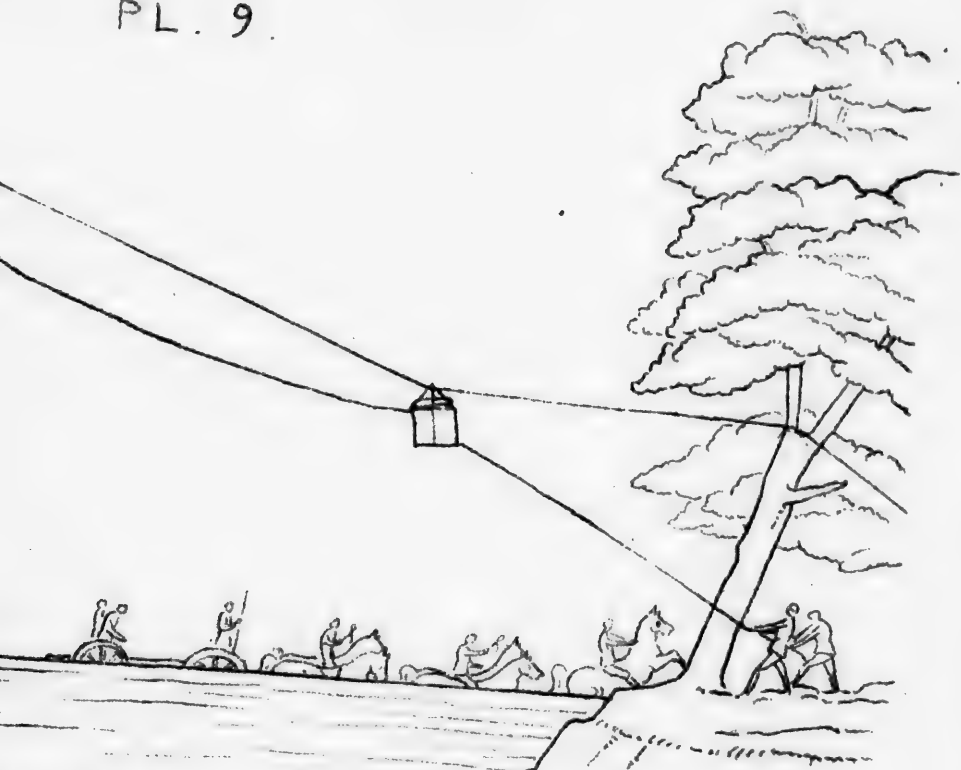


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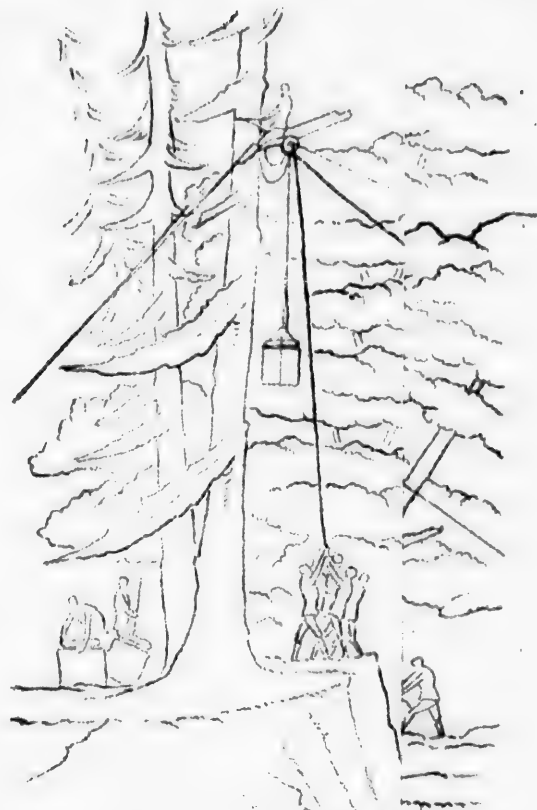


PASSAGE OF A RIVER, BY FIELD ARTILLERY

PL. 9.



ELD ARTILLERY, FORD 2' 6" TO 4' 6" IN DEPTH.



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scribed. When the banks of a river are wooded the limber boxes may be slung over on the battery picket ropes long-spliced together, using the prolong ring as a runner and the rope as the sling. See Pl. 9. Or the picket rope may be used as a cable in ferrying, the current almost unaided will send a raft across.

Slot bridges are easily constructed by Canadian axemen. All existing bridges should be examined, or enquired about, on an unknown route. They can easily be strengthened with timber. In selecting a point to force the passage of a river a re-entering angle is chosen, see Fig. In this case the bank on your own side is generally higher than the opposite, which is formed by the detritus of the stream in making the bend.

The re-entering angle also enables the opposite side to be swept by a cross fire.

A ford is generally formed from one salient to another by the drift of sand, &c., in rivers that wind.

In crossing guns a tolerably hard bottom is of the first importance.

Swampy ground has to be filled up with brushwood and corderoy road, but can generally be avoided by a detour.

MODE OF SWIMMING A HORSE.

Occasions may occur on service where men may be obliged to swim their horses; the rider should unbuckle the snaffle rein, which generally has a buckle at the centre, and cut the bit rein or unbuckle it from the bit and take it off, to prevent the chance of the horse putting his foot through; the head collar chain or rope should also be taken off and put in wallet, the stirrups taken up and crossed, nothing being left to entangle the horse. If the bit rein is not taken off the rider should leave it perfectly slack and scarcely feel the snaffle, taking a lock of the mane, together with the end of both reins, in his left hand. Any attempt to guide the horse had better be done by the slightest touch possible of the snaffle rein, or by splashing water on the side of the horse's nose from which you wish him to turn; but as a rule, the current will carry a horse down in spite of himself or his rider; "*C'est le premier pas qui coute*"—get the first horse over and the others will follow. The rider should lean his chest as much over the horse's withers as he can, throwing his weight forward and holding the mane to prevent the rush of the water carrying him backwards. If the horse appears distressed, a man who cannot swim may with safety hold the mane, and throw himself flat on the water, thereby relieving the horse from his weight. When the horse comes into his depth he may again get back to his saddle, or he may catch hold of the tail and allow the horse to pull him out if the water is deep near the bank and the man cannot swim.

Horses in draught should of course be unhooked, and all the harness except the head stall or snaffle bridle taken off. The harness can generally be carried in boats or rafts with the guns, the horses swimming—they will sometimes follow the raft if the driver sits on it holding the head collar rope.

FIGHTING TACTICS IN CONNECTION WITH OTHER ARMS.

The first Artillery tactical consideration is mobility, without which there can be no application of tactics in the field. How long since Marmont wrote, "*Le premier mérite de l'artillerie, après la bravourie des canonnières et la justesse du tir, c'est la mobilité*" ? Field Artillery tactics may be broadly considered under two heads:—

- 1st. Divisional, or supporting the infantry or cavalry division, paying the way for advance or covering its retreat;
- 2nd. Army Corps, or Reserve, acting and striking *en masse* on the key of a position, in obedience to the will of a master-mind. Artillery action, therefore, more than ever, requires an artillery head.

DIVISIONAL ARTILLERY.

In the Prussian army four field-batteries are attached to each division of infantry, and two Horse-Artillery batteries to each cavalry division; but half the above might be sufficient in a wooded country, with bad roads.

In any advance or reconnaissance, the Lieut.-Colonel commanding divisional Artillery should, as a rule, accompany the divisional general, with whom he ought to be *en rapport*, and transmit orders to battery commanders by his field-aides, the divisional Artillery Adjutant and Quartermaster, keeping a trumpeter with him. Army-signalling by lancer escorts has not yet been tried for directing concentration of fire in the field.

As soon as the Artillery fight is to commence, the Lt.-Colonel in command, after ascertaining the intentions of the divisional General, places himself at the head of the two or more batteries of divisional Artillery, and works them as one powerful battery under his own supervision; or he may consider it preferable to detach a battery to each flank, and so obtain a cross-fire or concentration from widely separated batteries. A battery on each flank is more convenient, also, to cover a deployment or change of front; during which, it must be remembered, the infantry-fire is dead. While the battery on the pivot-flank can continue its fire without intermission, that on the reverse flank should trot into a new position to do so, long before the infantry columns have deployed to deliver fire, or melted into skirmishers. But at all times considerable freedom to advance should be given to a battery commander, who, it must not be forgotten, holds a tactical unit; and, if he is a man of decision, will not let slip golden opportunities of action by any undue waiting for orders which may have miscarried in the confusion of battle. He

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should, however, remember the golden rule of Taubert, *i.e.*: "Divisional Artillery, like Divisional Cavalry, is merely an auxiliary arm, and that the infantry, and not the artillery, is the chief element in an action. It is, therefore, the duty of that artillery to comprehend the object momentarily in view, with quickness and accuracy, and powerfully to support the infantry in combat."

The following simple practical rules may be of assistance to battery commanders and others whom it may concern:—

1st. *If you cannot march you will never fight.* A few galled, lame or broken-down horses among your teams, mean the disgrace of abandoning a gun or ammunition wagon.* In this case prevention is the only remedy which a steam-power commander cannot ensure, unless in time of peace he has forged a chain of responsibility, every link of which bears a share of steady strain, from the sub-alterns commanding divisions, the sergeants in charge of subdivisions, down to the individual driver.

2nd. *Regularly trained Artillery collar-makers, shoeing-smiths and wheelers are very important personages,* and should be well supplied with tools and materials. Otherwise misfitting harness, that would produce many galls, would seem to be inevitable with Volunteer batteries turned out suddenly.

3rd. *Your limber gunners must be able to lay their hands on every article in the limber-boxes, 2 and 3 greasing wheels, screwing-up bolts, &c.*

4th. As you generally have to commence the fight, *never lose an opportunity of getting permission for your guns near the head of the column of march, except in a wooded or close country.* Under all circumstances, in addition to your eclaireurs in your front, have a couple of intelligent mounted markers. *non-commissioned officers, well in advance, to seek out passages over ditches, swampy ground, &c.*

5th. *Procure maps,* even when familiar with the country,—they are necessary for directing others,—and habitually use them, folded the size of your sabbatuche.

6th. *Note carefully every cross-road or lane,* as a means of breaking away to a flank, from which you will best be able to assist your infantry deployment by partially enfilading the enemy's line.

7th. *Avoid the converse of the above, that is, getting jammed up behind the leading battalions of infantry,* whose deployment will probably be checked unless you cover it, while the rear battalions press up and crowd round you, restricting your action.

8th. *Keep an eye on your neighbouring infantry,* with a view to mutual support in case of a rush by the enemy. Escort-duty of guns is distasteful, unless there is a strong feeling of camaraderie for the artillery. Infantry are unable to keep up, and, losing sight, perhaps, of both the guns and their own battalion, wander off, disgusted. Cavalry are little use against a resolute fire of skirmishers. The proper escort for guns would be the coming cavalry!—the long-talked-of mounted rifleman; and their place, the exposed flank of

* Not so with Cavalry, when a sore back means only a dismount-
ed trooper.

the battery, dismounted and under cover when practicable. If they formed part of the establishment of the battery, they would be doubly valuable filling casualties at the guns, or getting them out of difficulties with breast harness, which they should carry on their riding horses.

9th. *Leave your ammunition wagons under charge of the Quarter master Sergeant, or an officer if available, to follow at a distance, taking advantage of accidents of ground, and replacing expended ammunition by sending up wagon-limbers to be exchanged for the empty gun limber, which, when refilled, can again come up. It might be advisable to do away with wagons and have only an increased number of limbers, for facility of movement, &c.*

10th. *In advancing into action, the commander rides several hundred yards in front, to select a position and avoid a cul-de-sac; he is accompanied by his trumpeter and a mounted marker from each division to assist as range-finders, carrying a pocket-sextant and a measured piece of fishing-line on a reel, to take a base on Colonel Drayson's plan. The battery is brought up, silently by the sword-arm-signals of the commander, who will endeavour to bring up guns without being seen by the enemy, unlimbering in rear of a slope to avoid the teams appearing on the sky-line, and running the guns up by hand when practicable.*

11th. *The points for consideration of a position are, in order of importance:*

- (a) *Efficacy of fire;*
- (b) *Cover for the pieces and limbers, if possible, the reverse of a gentle slope permitting guns to be withdrawn till the muzzles only can be seen; best fulfil this condition, or 20 minutes with the entrenching-tools will give cover if no hedge or bank is available; a screen of bushes or a Canadian ralfence with a little earth thrown up gives confidence;*
- (c) *Position of the other troops, your own, and the enemy;*
- (d) *Facility of advance;*
- (e) *Facility of retirement;*

These conditions are seldom united in an equal degree. The commander must, at once, decide which is the most important to secure the object of the engagement and which to give up as least essential. No position can be called a good one that does not fulfil the first condition.

12th. *Avoid unmasking the position by opening fire until a worthy object is within range, which should not be above 2,500 yards, the limit of field-glasses by which the results of fire can be ascertained.*

13th. *Open fire deliberately from the leeward gun, firing a little short of the estimated range, increasing and correcting the elevation of the remaining guns, firing more rapidly as the range is ascertained or the foe comes to close quarters; but never waste ammunition, which encourages an enemy, unsteadies your men, and is difficult to replace. "If ordered to fire (uselessly, in your own judgment), obey; but fire as slowly as possible."* Opening fire at too*

* Orders of Frederick the Great to his Artillery.

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long ranges is the vice of all arms and all armies; restrained fire raises the confidence of those who practice it, and none can do so more steadily than the English, while it depresses those who have to advance on a comparatively silent foe.

14th. "*Guns should bear on that arm of the enemy's force which threatens most*—as a rule, the enemy's infantry and cavalry, rather than their artillery." When you do fire on an opposing battery, not in self-defence, but to save your own infantry being shaken before a contemplated assault by the enemy, let it be understood in your own battery that you concentrate on their centre gun (common shell and percussion fuzes); and when silenced, turn attention to that on its right, then left, and so on.

15th. *Guns being useless while limbered up, and a change of position necessitating a fresh estimate of range, the number of changes of position in action should be a minimum and the pace a maximum, provided it is steady.*

16th. *The subaltern's command of two guns should never be separated: they are battle comrades, and form as complete a unit as an infantry company. They are often detached from the battery for advanced guards or quasi outposts. It is not good for a gun to be alone; alternate fire is essential.*

17th. *Having a favourable position, keep it until the enemy retires beyond 2,500 yards or your own troops mask your fire; in either case, advance to within 800 yards of the enemy, and press his retreat. Should he advance, say within 800 yards, and that there are no special orders or reasons for holding the position it may be advisable to retire to about 2000, if the ground offers a second favourable position. 800 yards, or thereabouts, being the effective limit of infantry fire, is the commencement of perfect artillery efficiency. It may be necessary to sacrifice guns and gunners to save a broken infantry. Always deliberate before retiring unless specially ordered, and bear in mind that the last few rounds at close quarters often turn the tide of battle and bring you honor, or, at least, a sense of having done your duty to the uttermost.*

18th. *Reasons for advance to short range.*—Several reasons are given by Major Hoffbauer, of the German Artillery, why guns should advance to short ranges:—*Moral effect.* This cannot be over-estimated. Advancing infantry derives new inspiration when the guns pass close by in eager advance, and their opening fire is heard; while the artillery is impelled by anxiety to support its comrades of the infantry. With what a welcome are the gunners received at such moments, and the ring of the British infantry battle cheer, does not die in the memory of those who have heard it.

"*The advantage of being near at hand, to support the attack if checked, or to prepare the way for renewed efforts.*

"*The great advantage of close connection with the infantry, so that the artillery can co-operate at the right moment, which is always checked when the positions are too far to the rear.*

"The decreased liability of being masked by advancing infantry. Moreover, the guns are far more likely to be able to co-operate up to the last moment, before the actual assault, without hazard to the other troops. For at the decisive moment, smoke, unfavourable or misty weather, the sun shining in the eyes, dust flying about, approach of evening, and similar causes, very frequently render it impossible for artillery, posted far in rear, to distinguish friend from foe, and consequently it may, perhaps, cease fire at a critical moment, just when the enemy is bringing up fresh batteries, and hurls intact masses of infantry against the shaken assailants.

19. After a section of the ground has been stormed, the artillery is launched forward in large masses to secure its position, to pursue the enemy with its fire, and to prepare further attacks. It must not wait for higher authority, but take the initiative, and act in the spirit of the Commander-in-Chief's intentions. *To avoid delay the Artillery Commanders ride to the front during the last rush, as soon as the advancing infantry masks the fire of the guns against the principal object of attack, to watch the progress of the fight and observe where their batteries can be employed with greatest advantage.*

INSTANCES OF CLOSE ACTION.

At Weissenburg three batteries of the 5th regiment advanced to within from 500 to 800 paces against the Geissberg Castle, occupied by the French; and one battery even executed a short but exposed flank march at that distance, in column of route. Not a single gun was silenced or rendered immobile, even for a moment: but the whole remained in action until the capitulation.

"At the Battle of Sedan, the 3rd 4-pounder Bavarian Battery advanced at two p. m., near Balan, to within 500 paces of the hostile infantry, where it remained for three-quarters of an hour in line with the 6th Bavarian Brigade, and preserved its powers of action and moving. In Bazailles itself, after the failure of two assaults by a company of Bavarian Jagers against a large building, two 4-pounder guns were brought up, and fire being opened on it at 70 paces, it was evacuated by the enemy.

"In the action of 4th January, 1871, at Rouen, we have an exceptional instance of a battery of the 1st Regiment acting on the offensive against skirmishers at from 300 to 400 paces, and driving them back with four case shot, which were immediately followed by common shell. The battery had found itself at these close quarters owing to a dense fog, and was for the moment completely taken by surprise.

At Gravelotte, a single gun, one officer, and three gunners alone remained out of two very advanced guns of a battery that had crossed the ravine by the cavalry; and when ordered to retire, the young subaltern's reply, from the midst of his dying comrades, was: "Tell General Steinmetz that where guns have advanced, there also can infantry. Let him send supports to me; I will not retire to them; rather will I die on my gun-carriage, and rest here

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with my comrades." He did not retire from his position until he had expended his last shot, and brought his gun, which he had worked with the assistance of his three gunners, safely out of action, for the infantry did not come forward here until much later.

"In many of these" (and similar cases quoted in the text), "the artillery sustained enormous losses of men and horses. But German guns were never lost" (as far as Major Hoffbauer knows), "except when artillery had lost all contact with infantry. But at decisive moments, too great importance should not be attached to artillery losses, nor even to the possibility of losing guns. Each arm is fighting, not solely on its own account, but as a means of attaining the highest object—victory." •

FIRE-DISCIPLINE.

This must be attained by good instruction, and should exclude all errors and misconception with respect to choice of projectile, object and aim, range and order of fire. The officer controlling the fire-posts himself, as a rule, on the windward flank of the battery, he may send a look out man up a tree, or a church steeple, a windmill, or any available position of commanding a view, with a man to carry messages as to observed effect of fire. In firing, to obtain the range it is essential that the object be clearly indicated, and all the guns laid on it. Whenever the order designates a particular flank of the enemy's position as the object, it must be understood as referring to the flank so called by the enemy, *e. g.*, the left flank of a line of skirmishers would be the right flank looking from the battery; similarly the fourth gun would be that called so by the enemy, numbering from his right.

• FOOT NOTE.—The instances of British Artillery successful close action are too numerous to mention, and yet the Royal Artillery never lost a gun during the whole Peninsular War. But as the arms in use have been so modified it is not necessary to dwell on particular instances; those in India, perhaps, reached a point of audacity and success without parallel. As when Captain Maude with his 9 pr. guns in column of route exposed to the fire of heavy guns and infantry, led the army of Havelock into Lucknow, his subaltern, Lieut. Matland, actually running a gun into the gate and fighting it at 100 yards or thereabouts against infantry; of course the gun detachment was renewed more than once; the total loss of the battery was one-third of its strength. The late Colonel Middleton in a somewhat similar manner led his battery within pistol shot of the loopholed walls of the Shah-nu-jeef, being wounded and having three horses shot under him, his subaltern, Lieut. Smith, ran a gun into the gateway, fighting in a similar manner against close infantry fire. There are numerous unrecorded instances of this sort of successful action during the Mutiny campaign, the leading characteristic of which and the probable source of success was "*L'audace, encore l'audace, toujours l'audace.*"

ARTILLERY OF THE ARMY CORPS AND RESERVE ARTILLERY.

THE COMMANDER OF THE ARTILLERY.

He accompanies the Commander-in-Chief of the army in his reconnaissance, in order to receive his orders. As soon as fighting commences, he personally assumes command of his own arm. During the course of the battle the Commander-in-Chief keeps him acquainted with his intentions, and furnishes him with orders. "In order to learn these," says Hoffbauer "it may be necessary for the Artillery Commander to leave his own troops temporarily, even after the battle has commenced. He obtains information during the combat respecting the ground in front and rear, and takes precautions, as far as possible, against any impediments to future movements. In order to insure a timely supply, he watches over his communication towards the rear, and gives a sufficient warning of a contemplated movement in that direction to the second line of wagons. Should the course of the contest be favourable, he selects fresh positions, riding to them in advance to reconnoitre. In the event of retiring, he remains with the guns and sends back officers to reconnoitre supporting positions."

Reconnoitring—by cavalry—and investigation of the enemy's position, must precede the efficient fire of artillery. The more searching the former, the more effective will be the latter. Mistakes, especially with respect to the front and extent of the hostile position, necessitates changes of front, which paralyze the fire, and can be executed only with great loss, especially when the artillery line is extensive.

Unity of control is essential to artillery on the battlefield; consequently, tactical connection is to be broken only when required by the object or the ground. For example, in the attack, in order to outflank an important objective; or, in the defence, in order to utilize all advantages of ground and to meet flank attacks. Artillery is employed, as a rule, in detachments of from two to three batteries; exceptionally by single batteries. The effect is increased by a concentration of fire on a single object, while by disseminating fire or batteries it is diminished. The extended range of rifled guns renders such a concentration of fire possible, since not only batteries at short ranges, but those more distant, can aim at a common object.

Besides the Divisional Artillery, each army corps should have, under the artillery commander on the staff of the army corps, a force of 4 or 6 batteries, according to circumstances, such as charac-

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ter of the country, discipline and training of the infantry. Raw troops require a large proportion of good artillery; bad artillery or good artillery badly handled is only an encumbrance.

In countries favourable to artillery action there may be a general army reserve of guns under the Artillery Commanding-officer on the staff of the Commander-in-Chief, to strengthen the artillery of any special army corps, for a decisive blow, or to be held in readiness (not immediately in rear, but to a flank) to advance and occupy the point of attack, and if carried to press retreat. A portion of the divisional guns may be taken to strengthen the army corps or reserve; but they must be a most self-reliant infantry who can with indifference see the removal of their guns to support another corps.

"It has been said the *greatest fault a General can commit is to have reserve artillery at all*; the preparation of attack is the function of artillery. Looking to the enormous power of its fire, nothing should prevent the concentration of all available means: every battery, every gun, should be in position; one gun may even make a difference. It is by acting in accordance with these principles, and placing in line as many batteries as possible, that we have won all our victories." This is the Prussian opinion of Von Hecker, which is more a question of the meaning of the word reserve than of the principles, borne in upon him probably as much by the mistakes of the Prussian artillery, who were too far to the rear in 1866, as well as from the success of shoving to the front as they did in 1870. This practice may be comparatively new in Europe; it is old in the east, where the British artillery in India have practised it for more than a quarter of a century.

A General who fails to bring his reserve artillery into action gains an indecisive victory, is defeated, or retires encumbered with useless guns, unless he has a very inferior enemy to contend with.

"With regard to the employment of reserve artillery, and artillery generally (especially horse), it must never be forgotten that no arm is capable of bringing such rapid and important assistance as field-artillery." * * *

"Let us suppose the case of an army engaged in battle with the enemy, and that an army corps a day's march or so distant is on the march to its assistance: the infantry of this corps can obviously take no essential part in that day's battle; the horses of the cavalry will arrive too tired for an effective charge; but light field-artillery, particularly horse-artillery, can give efficient assistance; for, directly the guns reach their position, the horses get time to take breath and rest while the guns are in action. For the same reason no arm can take more rapid advantage of any fault committed by the enemy than light field-artillery, as it can move as quickly as cavalry to the spot where it is wanted, and, having unlimbered, can throw its projectiles rapidly into the enemy's ranks."

A vigorous artillery initiative has the advantage of not only covering and gaining time for the deployment of your own troops, but obliges the enemy to display his position and probably his intentions.

"In the Prussian service, since 1863, the reserve artillery has been termed corps artillery. Far from being a reserve, this artillery is really like the divisional artillery, an advanced guard. Its duties are really those of an advanced guard. The duty of an advanced guard is to see the enemy first and come first into action. Artillery, from its range, ought to be the first arm to attack an enemy; an advanced guard cannot perform its duty of covering the deployment of the army unless it be powerfully supported by artillery."

The dictum of the first Napoleon, that "he who has the address to bring suddenly and unknown to the enemy an unexpected amount of artillery to bear upon the most important points is sure to carry them," remains correct in principle, but is to be acted upon not in a spirit of servile imitation, by an agglomeration of guns at close range, but by a concentration of fire from numerous batteries echeloned at considerable intervals, but not so wide apart as to lose unity of action under one head. The echelon provides against enfilade, facilitates change of front, bewilders an enemy as to range, and is convenient for advance or fighting retirement. On this much-wooded continent the massing of guns in contiguous lines would often be found impracticable. In certain defensive positions, the electric telegraphs of the country might be utilized,—if not, the army field-telegraph, so as to concentrate fire from batteries dispersed over a considerable area.

The point to be played upon, and a breach in the enemy's line effected for the assault of the infantry, should (other things being equal) be selected with the view of driving him from his communications with his base, and so gaining a decisive victory.

"There is nothing which tends to produce so great a moral effect as a heavy cross-fire of artillery. The best troops in the world get shaken and demoralized by such fire. Loop-holed houses or walls rapidly become untenable, and the shells search out the trenches or rifle-pits. The effect of a given number of guns placed so as to bring a converging fire on a portion of the defender's position is very much greater than if they merely brought a direct fire. A direct fire is more or less guarded against; but a cross-fire on a position produces the moral effect of an attack both on a flank and in front."

The rapidity with which villages, often the key of a position, become untenable under artillery fire, is a marked feature of modern battles. "General Woyna (7th corps) opened fire on Flanville, situated at a distance of about 1200 yards. The French infantry held this position strongly, and a close musketry had no effect on them. After a very short time the two batteries detailed for this purpose overwhelmed the village with shells; the houses took fire, and the infantry abandoned them; the 53rd regiment then advanced and took it. The guns were next turned on Coincy, which in a short time also became untenable, and the French retired. The German infantry, during these operations, remained with ordered arms."

"That arm which at any given instant of an engagement becomes the chief arm should always be allowed to select the ground most favorable for its position or for its advance."

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"At all stages of the engagement at long ranges, 2,500 to 800 yards, artillery will be the chief arm, and should not be deprived by the other arms of the most favorable position for its action. Not only would it be disadvantageous for the artillery, but all more so for the infantry and cavalry."

On the other hand, the artillery should yield choice of positions for advance at close ranges.

ARTILLERY ORGANIZATION

The following is from a *precis* of modern tactics by Major Home, Royal Engineers:—

The artillery of an army is commanded by a general officer, who is styled the commanding officer of artillery. He has to assist him a staff which is composed of two branches, one being charged with the duty of Adjutant-General, or personnel, the other being charged with the materiel; the head of the materiel branch is termed the director of the Park; both these subordinates are, if requisite, helped by other officers of artillery.

The artillery of an army corps is commanded by a Major-General, or Brigadier-General, assisted by a similar staff.

The artillery of a division is commanded by a Field Officer, who has a staff officer charged with both the personnel and materiel of the division.

The commanding officer of artillery with an army is charged not only with the command of all the artillery, but also with the supply of the 1st and 2nd reserves of small and great guns and ammunition, as well as with the important duties which devolve on that corps at sieges.

JOMINI.

The most suitable means of obtaining the greatest advantage from the artillery is by giving the chief command of that arm to an artillery-general who is not only an artillerist, but a good tactician and strategist. This General disposes not only of the general artillery reserve, but also of one-half of the guns attached to the division and army corps. He can thus, in concert with the General-Commanding-in-Chief, determine the moment and place where large masses of artillery can best contribute to victory. But such a massing of artillery must never be made except by order of the General-Commanding-in-Chief. The commandants of artillery and engineers have always made a portion of the staff of the army.

VON MILLER.

The commandant of artillery should be endowed with great coolness and intelligence. He should be close to the commanding-officer of the division, so long as his presence with his batteries is not absolutely requisite, in order that he may follow the course of the action and subordinate the artillery to its movements.

NAPOLEON.

It is the duty of the commandant of artillery to know the whole of the operations of the army, since it is his duty to supply arms and ammunition to the different divisions composing it. His connection with the commanding officers of Artillery at the advanced posts should keep him aware of all the movements of the army, and the direction of the Great Park is subordinate to these movements.

LE BOURG.

The General commanding the artillery has authority over all the troops of the arm. He may, with the approval of the General commanding, make all such changes in the personnel and materiel as he thinks advisable. He issues orders to the Generals commanding the artillery of army corps, and receives their reports; the central Reserve and Grand Park receive orders only from him; he fixes the depots as well as the marches; finally, he sees to the supply of the army from the parks and convoys.

He lives close to head-quarters, and when marching to attack an enemy he accompanies the General in all his reconnaissances, in order to select the places most suitable for his guns. In action he remains close to the General to receive his orders, if he does not himself direct the movements of the reserve at decisive moments.

The chief of the artillery staff receives from the staffs of corps and divisions reports and states of their situation, both as regards personnel and materiel. He sends them all orders issued by the commanding-officer of artillery and the general staff of the army. The Director of the Park is charged with the supply of ammunition and all articles required for repairs or exchanges, if these cannot be supplied by the corps and Divisional Parks. He keeps the commanding-officer of artillery aware of all expenditure of ammunition. The commanding-officers of divisional artillery receive orders from the Generals commanding the divisions to which they are attached as regards their marches and the military position they should occupy; but as regards interior economy and materiel, they receive orders from the commanding-officer of artillery, whom they keep acquainted with changes from day to day, the state of their supplies, and their wants.

GERMAN ARMY.

Although the cannon is the arm of all artillery, yet the diversity of object and manner of employment, as well as the different kinds of guns dependent thereon and the various modes of serving them, have necessitated a different instruction for the men, and a division of all into two categories—siege artillery and field artillery, which last is divided into field and horse, the latter provided with mounted gunners. This division, however, concerns the men of the corps,

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not the officers. The artillery officer is not destined for one only of the categories mentioned above, but rather for employment in either, and is educated accordingly. He is, as it were, a universal artilleryman.

MAY.

The leader of the artillery of an army should be a General of the first class.

Everything points to the fact that of all arms field artillery is not a force to be extemporized on emergency; and Prussian experience of artillery failure in 1866 (for there has been Prussian failure as well as French failure) shews, in the words of Captain Hozier, that "a large infusion of raw element into field artillery, to strengthen it, defeated its object by crippling the efficiency of batteries."

TURCO-RUSSIAN WAR.

The experience of the Turco-Russian war will, I believe, shew that perfect Artillery material in the hands of partially educated and uncivilized races leads to little result, especially when tactical artillery leaders are wanting. The best guns require educated officers and men to work them, artillery chiefs to put them in the right place, and bold hearts to keep them there.

SALIENT ARTILLERY OPERATIONS IN THE FIELD.

FROM THE ARTILLERY RETROSPECT OF 1870. *

It is commonly supposed that the superiority of the Prussian artillery was the principal cause of the German success, and, indeed, the Emperor Napoleon himself attributed his final disaster at Sedan to the preponderating influence of the German field artillery; but it was not altogether so: the artillery was but the keystone of that arch of triumph under which the German Emperor marched to victory.

It is easier to blame the grooves of a gun than the heart of a great nation. The French people (for I hold people responsible for their Government) preferred a standing army and a system of substitutes to a national force and universal service; therefore, they were utterly outnumbered; and their centralized system of dealing with war material, of which the English control was a bad copy,† rendered it impossible for them to equip and mobilize their armies as quickly as the Germans, who habitually decentralize and delegate the responsibility of equipment to the commanders of their local *corps d'armee*; and lastly, they were out-generalled, because their *etat major* and system of military instruction were inferior to the Prussian. Notwithstanding the war-cry, "*a Berlin*," they found themselves on the defensive, extended over a long arc from Thionville and Metz to Strasbourg; while the Germans operated on the shorter cord of that arc by the valley of the Saar and Wissenburg. The French advanced posts too far from their supports, hugging the frontier, yet not feeling beyond it, knew not of the vast German concentration in the wooded country close to their front. It is very difficult to unravel the thread of artillery action from the tangled web of battle, because artillery plays a double part in the great game—1st, divisional, or merely supporting and acting with the other arms; 2nd, concentrating and striking terrible and decisive blows as a separate arm.

The first great battle of the last great war was at Wissenburg. We cannot linger over the historic reminiscences of the old fortress that once rolled back the tide of war under Marlborough.

In the same locality, the Crown Prince of Prussia, with more than forty thousand men, surprised and destroyed the corps of General Douay, only 8,000 strong. While the French were cooking their morning soup, the mass of Prussian guns, having gained the

* Artillery Retrospect of the Last Great War, 1870; With its Lessons for Canadians, 1872. By Lieut.-Colonel T. Bland Strange, Dominion Inspector of Artillery.

† Sir William Mansfield calls "the control a system for uneducated Generals," and I would add artillery officers, who are scientifically and practically instructed in the manufacture, repair, and care of war material; and yet, you take from them the most important part of their duties, to be handed over to civilians.

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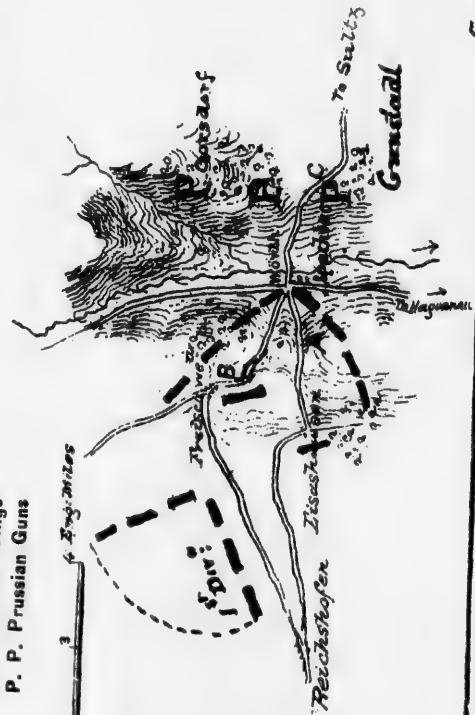
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heights of Schweigen, suddenly opened a heavy fire on the enemy's camp and the village of Wissenburg. With the old impetuosity of their race, the French sprang to arms, but were ordered by General Douay to remain as much as possible behind Wissenburg. The precaution was useless; the Prussian guns, from their commanding position, rained death upon them, whether they advanced or sought shelter. The French artillery, consisting only of three light field batteries and one of mitrailleurs, was soon overwhelmed; and, according to the German official account, "the mitrailleurs fired only a few rounds, and were easily silenced by the Prussian guns." The overwhelming numbers of the Crown Prince outflanked and took the hill of Geisburg; the outnumbered French, still pursued by the deadly Prussian shells, and harassed by the cavalry, turned retreat to rout. Wissenburg was quickly followed by Wörth. The French position was salient, almost semicircular; thus offering to the Prussians the opportunity ever coveted by artilleryists, viz., the chance of enfilading both wings from a point nearly opposite the centre. The Prussian guns were thus massed on the heights south of Gersdorf and north-west of Gunstadt, and, as usual, they were felt before they were seen. Those on the Gersdorf heights commenced the action by enfilading the whole French left, and compelling Marshal MacMahon to change the front of the first division; the manoeuvre was brilliantly executed by the French. Later in the day, fourteen German batteries (84 guns), near Gunstadt, were launched upon the French right wing, enfilading it in the line of its greatest depth; and not only the fourth division, but also the unfortunate second, which stood behind them, and had already borne the brunt of battle at Wissenburg. A battery of the 5th corps, north of Spaebach, occupied the French guns; these latter are said to have been well served but poorly handled, for the gallant French artillery seem to have forgotten the tactical lessons of their great artillery chief, Napoleon I. They, however, nobly sacrificed themselves at the close of the action in endeavoring to save their broken infantry. At this battle, also, the French were greatly outnumbered, and failed to receive assistance from De Failly's corps. MacMahon's position was strategically good, as fairly covering the two important railway communications with Strasbourg through Hagenau, and with Metz *via* Bitsche. On the same day that the Crown Prince thus severed the French army and cut off its right wing, some forty miles distant, in a north-westerly direction from the field of Wörth, the first Prussian army, under Steinmetz, assisted by part of the second, also cut the French line at Spichern, thus hopelessly dividing MacMahon and Bazaine. The ridge of Spichern overlooks the village of Saarbrück, the scene of the *baptême de feu* of the Prince Imperial. As usual, the French were surprised by the opening of the Prussian artillery, six batteries, from a hill overlooking the valley from which a part of Frossard's force had not been withdrawn. The leading artillery features of the battle are the rapid bringing-up and concentration of guns, in some instances galloping along the roads to the front, while the infantry of their divisions were partially sent on by rail. This mobility of field artillery is possible only to the Prussians—not to

the French, from the defective system of not carrying gunners with the guns. It is said that the Prussian guns, after advancing over the plain, produced little impression, firing up-hill on the French infantry extended on the ridge, from the fact that shells fired with percussion fuzes either buried themselves in the face of the abrupt slope or flew harmless over the heads of the defenders.

The French guns massed on the left to oppose the flanking movement on Stering, dislodged the mass of Prussian cavalry who were sent under cover to the other flank. This should have been a great gain, because the road to Forbach was the strategic line of French retreat and support. But the crowning artillery achievement was the daring advance of two batteries of German guns up a steep mountain-track, on to the summit of a ridge on the French right, where they enfiladed the whole line. I was informed, through a Prussian general, that the French line, who had resisted so gallantly, were first shaken by this fire, which drove them from their entrenchments, and rendered possible the final advance of the German infantry, whose previous losses, while supported only by direct artillery-fire, had been terrible; also, at this critical juncture a mass of German guns advanced, and firing across the road and rail-way, enfiladed the French left, and threatened to cut off the line of retreat. In the earlier part of this battle the French had the superiority in numbers and position; but they were left by their generals with a most inadequate supply of artillery—one of those unaccountable mistakes which marked French generalship. While Frossard's force fought splendidly all day, seven divisions of Germans stood inactive ten miles from the valley of the Saar. The Bazaine's force, having turned the French left by Forbach, the 2nd division, sent by Bazaine, could not cover the retreat of Frossard's utterly disorganized force, which retreated to the south-west, leaving open the road to St. Avold and Metz. Then the German armies, with a cloud of cavalry in their front, gradually brought up their left flank. The small fortresses of Phalsburg and Bitsche, especially the latter, whose guns commanded the line of rail to the west, compelled them to make a considerable *detour*, and leave behind a masking force. They held out for a long time, and shew the advantage of even a small fort on a strategic line of road or rail.* The French commanders proposed to abandon the line of the Moselle, leaving a garrison in Metz with orders to defend or die,—the scattered divisions concentrating at Chalons (the only safe point for concentration), there to fight on their well-known exercising ground, where, history tells us, the fate of France had before been decided in her favor. With Paris as a base and reinforcements to swell the army, the result of the war might have been different; but politicians stepped in and decreed her ruin. Bazaine, appointed to the chief command, remained at Metz (where the Emperor also lingered), hoping to fall upon the divided German armies crossing to the north and south of Metz; but their whole force passed to the south

* Phalsburg, with 60 old gunners, 1500 Mobsles, and a handful of Zouaves and mixed-up regulars, was bombarded, but held out six months, until want of salt, it is said, caused surrender.

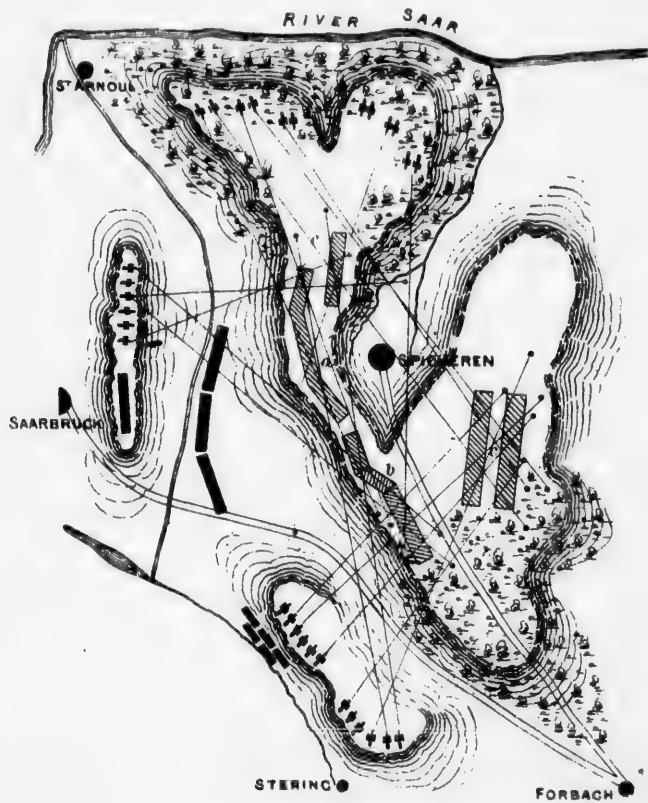
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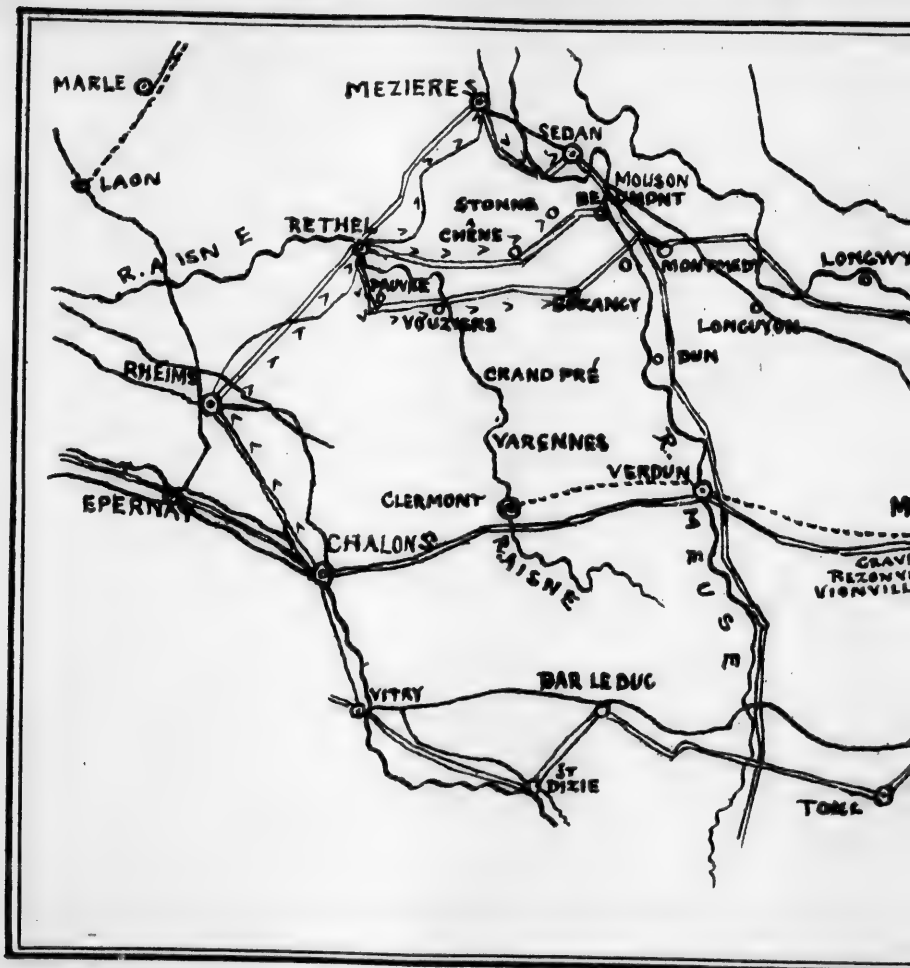
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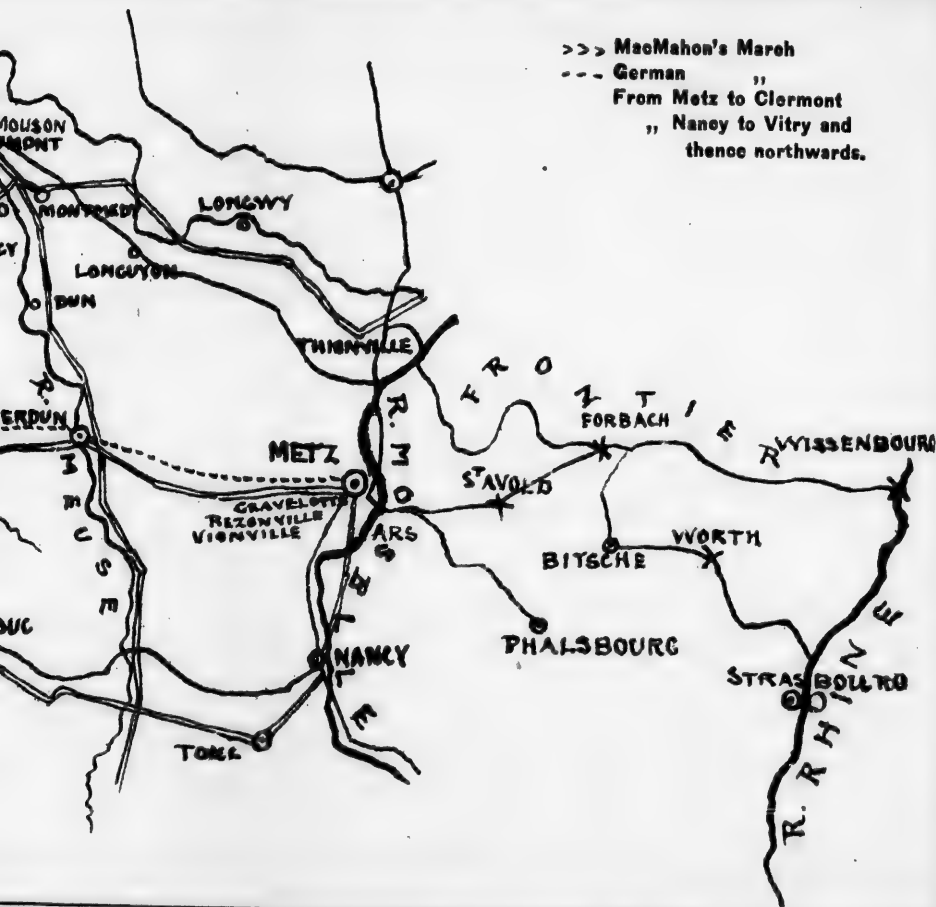




P. B









at Ars and Pont a Mousson, while Steinmetz had occupied the attention of the French by the battle of Courcelles. This was an obstinate soldier's battle, without any particular display of tactical skill. Bazaine committed an error in fighting at all; having previously determined to retreat towards Verdun, he should have done so, and left the protection of his rear to the fortress, instead of fighting a battle with his army astride of the Moselle, and an enemy whose object it was to detain him. The French engineers had unaccountably neglected to blow up the bridges over the Moselle, to the south, though they destroyed some in their own line of retreat. Bazaine's first march was a very short one, and impeded by an enormous quantity of baggage. He gives a further reason for delay in the fact that the French intendency, or control department, had stowed away six million of cartridges without telling him where to find them, and, moreover, had themselves forgotten their whereabouts. This gave the Germans time; they pushed forward as far as Mars-le-Tour with cavalry and guns, and struck the head of the French advance, also cavalry, apparently without guns. The French prepared to charge; but the German cavalry, who masked their guns, wheeling right and left, opened out and left the guns to work their deadly destiny, and thus turn the tide of French retreat.

At Vionville and Rezonville, in a somewhat similar manner, the French columns were fiercely struck, and held by cavalry and artillery until the infantry came up. The success of the final infantry onslaught is attributed by Captain Hozier to the Prussian artillery being, as usual, massed on their enemies' flank. The extraordinary mobility of the Prussian Field artillery, principally due to their system of carrying sufficient men on limbers and gun-axle-seats, rendered possible their style of vigorous artillery action, impossible to the French with their antiquated system of carrying gunners on the wagons, or leaving them behind out of breath.

The Prussian cavalry sacrificed themselves with the same heroic gallantry as the English at Balaklava, with the difference that their self-sacrifice had a strategic object and result, viz., holding the French for their comrades to come up. One terrible charge was made through two French batteries with bolles of infantry in their rear, to be finally met by the hostile cavalry. A little more than a fourth of the horsemen responded to the regimental call at that night's bivouac.

The French fought with the determined fury of their race, and inflicted terrible losses on their enemies, considering that they had gained a victory; but as corps after corps came into position on the left, and wheeled up, the German army, which at first looked northward, finished the fight with its front to the Rhine; while Bazaine had been compelled to fight with his face towards Chalons, and Paris his line of retreat, just a fortnight from the opening affair at Saarbruck. After these bloody struggles at Mars-la-Tours, Vionville and Rezonville, Bazaine took up a position at Gravelotte. He had been nearly taken prisoner by the rapid German advance, whose guns had actually opened fire on the rear of the Emperor's

LENDOURA

Pl. A

escort as he left the army with his son. The tactical advantages of Gravelotte as a defensive position showed that skill in the selection of ground, for which Marshal Bazaine is famous. It is a long ridge, the top of which forms an open natural glacis; the crest was strongly intrenched, and his artillery there posted; the left rested on densely wooded ravines, running down to the Moselle; and one of these, parallel to the face of the position, is difficult to cross except by the road running at right angles to the French front, which was swept with guns and the fire of a fortified farmhouse. The Prussians lost terribly in repeated attempts to attack by this central road. And it was a terrible waste of life, as it was only necessary for the Prussians to hold the French in this part of the field until the strategic key of the position was turned upon them. The Verdun road, on the French right, in the direction of St. Privat, was that key, Bazaine's line of communication with France. The difficulties of assault on the left of the position (together with the fact that the reserve of the French guards, who were posted in a valley on the left rear, supported by the forts of St. Quentin and Phlapperville, would have rendered German advance in this direction a barren and bloody honor,) made this part of the fight on the Prussian right almost entirely an artillery action, where the corps artillery, 84 Prussian guns, were deployed by a most spirited manœuvre. With Hussar escorts they galloped up a lane through one of these ravines, which concealed them till they reached the *plateau* south of Gravelotte, sending their ammunition wagons by another road parallel and leading to the rear of the intended position on which the 14 batteries deployed in succession. The guns were crowded, to avoid drawing fire by extending in front of the village, which was used as a field hospital; and the loss of the Prussian artillery here is evident from the mounds of earth that mark their resting-place—"man and horse in one red burial blent." The three leading batteries were met by the fire of four *mitrailleurs*; but, concentrating their whole fire on the nearest, there remained nothing but wreck after a single round. The second and third were treated to a similar dose of concentration, and the fourth retired precipitately to avoid annihilation.

This concentration of fire, to be produced in the heat of battle, must be inculcated and practiced in peace. The whole 84, thus concentrated on the French guns, silenced them in succession. This sort of advance of the right men, at the right time, to the right place, was, in a great measure, due to the excellent maps served out to artillery-commanders by the Prussian War-office. I was favored with the loan of one of these that belonged to a Prussian captain of artillery; it was a photograph-copy of the map of the French survey. They were turned out in Prussia by thousands long before the war; and, though it folded up so as to fit the pocket, it was so clear that by its aid any average artillery-commander could act with trenchant certainty. Among the sayings of soldiers worth remembering is that of Marshal Saxe, that "the first requirements of an army were legs, the 2nd legs, and the 3rd legs." It is equivalent to that of Wellington, who reiterated "boots." In Lower Canada it might possibly be "snow-shoes." Prussian officers reite-

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rate "maps," accurate maps, distributed to staff-officers, squadron-leaders, and battery-commanders. The infantry, working in larger units, do not require so many, except on outposts. The French resisted every assault until the ammunition of Canrobert, who commanded their right, failed. They were, as usual, outflanked by the Prussians (the Guards and Saxons), whose artillery, occupying the hill of St. Privat, at right angles to the French position, enfiladed it, and rendered possible the steady advance of the infantry, whose previous attack in column without sufficient artillery preparation had been such a sanguinary failure. It is worthy of note also that the isolated attempts of German artillery to advance direct in the open to close range, 600 yards, against infantry in shelter trenches, resulted in artillery destruction.

The final catastrophe of Sedan was the greatest triumph of the German artillery. When that fatal morning dawned the unfortunate French saw, from every gentle hill of the amphitheatre that surrounded them, the white puffs that shewed the trial-shots of German guns. Their concentrated fire was unendurable, and enfiladed each face of the old fortress situated in a basin; and thus a fortress and army fell before the field guns of an army wielded with strategic skill. Of course, we must not forget that it was political interference that dictated a movement on a line that ended in a fight with a neutral instead of a friendly territory in the rear.

Not much artillery incident of value is to be gained by following the struggles of the brave but ignorant and undisciplined levies, *en masse*, who, organized by eloquent *avocats*, tried in vain to oppose the national army of a people who for half a century had patiently practised the art of war in peace, and were not too effeminate to ignore the duty of personal service, without exception, for peasant, mechanic, merchant, professional man or noble.

FIELD ARTILLERY ENTRENCHMENTS.

Artillery should always avail themselves of natural features but occasionally it may be necessary to make gun and limber trenches. A gun trench of the dimensions shown in the subjoined plan can be made by a gun detachment in an hour.

Table of Dimensions.

	Ft. In.
Breadth of narrow end	5 0
" broad end	12 0
Length of pit	10 0
" ramp	8 0
" side-pits	4 0
Breadth of do. at top	3 0
" bottom	2 0
Breadth of steps inside pits	1 0
Depth " "	1 6
Breadth of Berm	from 1 foot to 2 0
Depth of gun-pit	2 0
Height of parapet	3 0
Slope of ramp, $\frac{1}{4}$.	

The work should be commenced where the pick-axes are marked on the plan, the seventh man being employed in shovelling and ramming on the parapet. The addition of two or three men would enable the parapet to be made thicker by earth obtained from a small ditch in front. Two more men might be employed in forming the embrasure, revetting the parapet and ramming. If twenty men were employed the workmen might be relieved occasionally, and the side trenches for ammunition or the gun detachments might be lengthened. Isolated gun pits would form a conspicuous mark; shelter trenches should therefore be made to the right and left. If necessary limber pits, somewhat in the shape of charger pits, for a limber and a pair of horses each, might be constructed. They should be of the following dimensions:—

Limber Pits.

	Ft.	In.
Length.....	12	0
Width at top.....	7	0
bottom.....	5	6
Depth.....	3	0
Ramps at each end, $\frac{1}{4}$ or $\frac{1}{2}$.		

If necessary similar pits, but with a berm of 2 feet for the horses' heads, could be provided for the other horses.*

Semi circular Barbette Field Gun shelter on natural terreplein.

When gun-pits are dug in soft soil the wheels and trail are apt to sink with continuous firing. In some situations it would be advisable to leave a platform for the gun on the natural level. The sod gives a sort of elastic resistance to the sinking of the gun. A wooden platform, is not, however, a difficult thing to procure in Canada where planks are generally procurable at short notice from a neighbouring shed or barn. When such is not the case, it is advisable not to excavate a platform for the gun, but dig a trench for the gunners round the front and sides of the natural platform from which the gun can be served, the earth being thrown outwards to form a parapet. No. 1 is a good deal protected by the gun and carriage, and can himself serve the vent and fire on emergency. No. 4 can traverse kneeling. A Canadian snake fence may be very rapidly extemporised into field gun shelter, say in half an hour by the gun detachments with the entrenching tools carried on the gun carriages and wagons. It would be all the more defensible with picked infantry marksmen intrenched behind that portion of the fence which is between the guns. Intervals should always be left for the free advance of the guns.

* The above is from Major Knollys' Hand-Book.

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PART I, SECTION III.

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1. The first essential is the due maintenance of a chain of authority and responsibility, every link of which bears a share of steady strain from the Commanding Officer to the subaltern commanding divisions, the sergeant in charge of sub-divisions down to the individual gunner or driver. Links that are overlooked or allowed to hang in idle festoons are apt to snap under the sudden strain of service. It is, therefore, most desirable for a commander to endeavour, as far as practicable, to convey orders or even reprimands to a subordinate through the officer responsible for the conduct of the individual.

In the Artillery service the Battery is a natural, tactical and administrative unit, and in the Field Artillery is divided into divisions of two guns, commanded by an officer, forming in itself a minor, tactical unity, which should not be overlooked.

In the Garrison Artillery the same principle holds good.

The Commanding Officer may delegate to a subaltern power of punishment to the extent of two days confinement to Camp or Barracks.

OFFICERS IN GENERAL.

2. All officers are to consider exactness of time at parades and posts of assembly, as one of the first principles of military duty, and are earnestly enjoined, by strict adherence to all orders, to set an example of good order and Military discipline to every soldier under their command.

3. They are to make themselves acquainted with the Militia Regulations, Articles of War, Queen's Regulations, and all General, Garrison, and Artillery standing orders, of which latter they are to have a copy in their possession. Ignorance of orders will never be admitted as an excuse.

4. They are always to treat Non-commissioned officers with kindness, not reprimanding them in the presence of the men when it can be avoided, and although no misconduct or neglect should be overlooked, they are required to be very cautious in confining them.

5. They will make themselves acquainted with the names of every man in the Battery to which they belong, and endeavour to acquire a knowledge of his disposition and character. When they reprimand a soldier, they will on no account use violent or irritating language, and in no case whatever allow him to make an answer, on parade.

6. Officers signing documents, are to put their regimental rank immediately after their name; and if they have brevet rank, it is to follow the regimental rank, and also to name the Battery they belong to, which should always be in the officer's own handwriting.

7. Officers of Field Batteries, are to be most attentive to their stable duties. They will see that the horses are properly cleaned, the stables ventilated, and the horse appointments arranged according to order.

8. In the like manner, in visiting the men's rooms or tents, they will see that the beds or blankets are folded, arms arranged, and clothing disposed according to order.

9. All Field Battery officers are expected to attend mid-day stables.

Special to "A" and "B" Batteries, G. S.

10. Short course officers will send to the Office, every Monday morning, for the information of the Commandant, a diary of Parades they attended, and of work, theoretical and practical, they performed during the past week. A book, ruled according to regl. form 1, may be obtained from the Office, on application.

11. Officers are reminded that they are bound by the Articles of War, to attend Divine Service. They are to parade with their respective denominations, when the senior present will take command of the parade, and march it to and from the place of worship.

12. Officers may employ gunners or drivers as servants, the practice being sanctioned as an indulgence. Application for a servant must be made to the Officer Commanding, according to regl. form 2.

13. Application for leave of absence must be made in writing, and submitted, through the Adjutant, to the Officer Commanding.

14. Short course Officers are to attend Orderly Room at office hour every morning, until dismissed by the Officer Commanding.

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SHORT COURSE OFFICERS' DIARY.

Date.	Theory.	Hour	Practice.	Hour	Remarks.

____BATTERY GUNNERY SCHOOL.

Regl. Form 2.

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Division. *Recommendation to be employed as Servant.*

Regt. No.	Rank & Name.	By whom to be employed.	To replace whom.	Remarks.

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15. Long and short course officers are to provide themselves with the following books, to be shewn at inspection:—

New Manual for Canadian Militia Artillery.

Artillery retrospect, by the Inspector of Artillery, of the Franco-Prussian war, 1870-71—Price, 50 cts.

One of the three following will suffice:—Hand-book of Field Service, (Lefroy); Griffith's Manual, or Wolsey's Soldiers' Pocket-book.

Parts of new Manual above referred to, including Standing Orders for Canadian Artillery, as authorized by the Major-General Commanding, should be in the possession of every Militia Artillery officer; they are intended to obviate the necessity of purchasing so many books of reference.

All officers are to provide themselves with a copy of that part of the Manual for Canadian Militia Artillery to which they belong, Field or Garrison.

They are also recommended to have copies of the following:—Queen's Regulations.

Militia Regulations.

Hand-book for Field Service, 80 cts.; or Griffith's Manual, \$1.25.

Artillery retrospect, 1870-71—50 cts.

To be had on application to the Inspector of Artillery.

Special to "A" and "B" Batteries, G. S.

16. All Battery Accounts,

Officers Mess "

Band Fund "

Canteen Fund "

Battery Ledger,

Hospital Accounts,

Fines and

Quarter-Master's Accounts, are to be submitted to the Commandant, on or before the tenth evening of every month, at 8 o'clock, in the ante-room, officers' mess; all officers concerned to attend. Mess bills and regimental debts of officers to be then settled for the past month. The Secretary of the Mess will make a report to the Commandant of all mess bills not paid in accordance with the above order.

OFFICERS COMMANDING BATTERIES.

Recommended,

1. The officer in command of a Battery is responsible for its internal management and conduct, in every particular; he is answerable that his Battery is in every respect fit for *immediate service*; that all the duties are carried on by the officers and men with energy and zeal; that all orders and regulations are adhered to in every respect; he is, personally, accountable for the arms, ammunition, accoutrements, clothing and stores, belonging to his Battery. It is his duty to keep, at all times, a correct roll of his Battery.

2. He is responsible for the general uniformity of the dress and appointments, the smart appearance of his officers and men, and the general discipline of his Battery.

3. Whenever a Battery is ordered to march from one station to another, a Marching State is to be forwarded to the Brigade-Major, on departure and arrival; every man is to march with the Battery, except the baggage guard and the sick.

4. Whenever a man or horse becomes injured, the Officer Commanding the Battery will immediately report the circumstance, in order that a Court of Inquiry may be ordered to investigate the case.

Special to "A" and "B" Batteries, G. S.

5. He will make arrangements for depositing the men's monies in a Savings Bank, and those who wish to do so, will have a receipt book given them, and can draw their money themselves.

Special to "A" & "B."

6. He will pay the Battery regularly at least once a week, and should on no account be absent at the last monthly settlement, when the men will sign their ledger sheet in his presence.

Special to "A" & "B."

7. He will inspect the Barrack rooms and married quarters, with the Qu-Master, once a month, and inquire into all breakages, in order to ascertain who should be charged with them.

SUBALTERNES.

1. They will be required to have a perfect knowledge of the Division of the Battery which they command. From them also is expected the same attention to their stable and other duties, and an implicit obedience to the directions of the officers in command of batteries.

2. They cannot have too much zeal in the execution of their duties or too much anxiety for the appearance of their battery, the dress, conduct, and comfort of the men, especially those of their own divisions.

They are to instruct them in their duties as Artillerists, and satisfy themselves that they are well acquainted with the practical rules of Gunnery and Field Artillery, and that they can lay the guns with precision.

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3. They are responsible for everything connected with their divisions, the condition of their horses, &c., and they are to send in a weekly report on the horses, guns, carriages, &c., to the Captain of the Battery, according to the following Regl. form 3:

Date.....

Sir, -

I inspected the horses, guns, carriages, ammunition, small stores, appointments, men's kits, harness, and everything belonging to my division, during the past week. The horses are all shod and effective (except Nos. ——— sick.) I examined the mess books and have nothing particular to report, (except.)

For Subalterns of Garrison Batteries, the report will be as follows:

Date

Sir,

I inspected the ammunition, appointments, arms, accoutrements and kits of the N. C. officers and men of my Division, which I found correct, except such deficiencies as are mentioned in the report attached of the N. C. officer in charge of the Division. I examined the mess books, and have nothing particular to report, (except.)

4. All subaltern officers will attend the morning drills of their batteries, and the orderly officers those of the afternoon as well.

5. If, being in Garrison batteries, they are detailed specially in charge of one or more Districts, or parts of lines of fortifications, they will have charge of the armament, stores, &c., contained therein, and will at all times be acquainted with the state of the armament and stores; also with the quantities of each description of stores. They will at all times be responsible to their superior officers, that the armament and stores are kept in proper order and state, requesting the necessary detail of N. C. officers and men for that purpose.

6. Officers in charge of Artillery Districts as above, will inspect them once a week, and send in a report of such inspection to the Officer Commanding through the Adjutant, every Monday, at office hour. The report will be added to Regl. form 3, as follows:

I inspected my District once (or more) during the past week, and found all correct, (or otherwise.)

Special to "A" and "B" Batteries, G. S.

7. Officers in charge of Divisions are responsible that a sufficient supply of vegetables is obtained for the messes of their Division. A certain portion of the stoppage for mess purposes is made to purchase vegetables, and the men should be encouraged to have soup for supper, especially in winter.

8. They will occasionally examine the packs or valises of the men of their Division, when they parade in marching order, and ascertain that they carry the proper Field kit.

9. They will report any man not having the lace of his tunic and the band of his forage cap properly cleaned and yellow when parading.

10. When vacancies of N. C. officers occur in their Divisions, they will, if notified, send into the Orderly Room, for the promotion of such N. C. officer or gunner as they may think fit, a recommendation, to be submitted to the Officer Commanding.

OFFICERS ON DUTY.

1. A subaltern will be detailed for duty, daily or weekly, as orderly officer, and he is not to exchange duties, except with the permission of the Officer Commanding or the Adjutant, when there is one.

2. He will visit the Barracks and kitchens, see that dinners are properly cooked, and the messes well supplied with vegetables, and in a Field Battery superintend the receipt and issue of forage.

3. He will see that the men are present, clean, and wear their fatigue dress whilst at dinner, &c.—(For detail of duties, *vide* orderly officer's report, Regl. form 4.)

4. He will, if a Field Battery officer, attend when horses go out in exercising order, and is responsible that the men are properly dressed and ride correctly.

5. He will not leave Camp or Barracks during his turn of duty, except with leave from the Officer Commanding.

6. He will inspect rations of bread and meat daily at the hour of issue, and if they are found of bad or inferior quality, he will at once cause a board to assemble, consisting of the Quarter-Master, the next officer for duty and himself. If the rations are condemned by the board, a fresh supply will be purchased. A copy of the proceedings of the board will be sent to the orderly room for the information of the Officer Commanding as soon as possible after the sitting.

7. He will ascertain at guard mounting, that every man has his field kit in his pack.

8. He will send to the orderly room at office hour, the day following the expiration of his turn of duty, a report Regl. form 4, as nearly as circumstances will admit, similar to the following:—

ORDERLY OFFICER'S REPORT.

SCHOOL OF GUNNERY,

187

SIR,—

I have the honor to report:

Bread and Meat.

1. That, as Officer on duty on the I attended at the issue of Bread and Meat, and found them of weight and of quality.

Meals.

2. I visited the Barrack rooms at and found everything regular: the Messes were supplied with vegetables; No. rooms had soup for supper; the men were all present, and complaints

Guards, Sentries.

3. I visited the guard and sentries at o'clock by day and at o'clock by night; also, the prisoners in the Guard-room and Barrack-cells and found

*Prisoners.**Thermometer.*

4. I ascertained that the N. C. O. in command of Guard can read the thermometer. I explained Standing Order No. 9, Section 5, and inspected the Record Book in the Guard-room, which I found in good order, entries up to date.

Canteen.

5. I visited the Canteen at o'clock, and found

Hospital.

6. I visited the Hospital, and found and complaints.

Cook House.

I signed the Register.

7. I visited the Cook-house at o'clock, and found

Gymnasium.

8. I visited the Gymnasium at reported

Stables.

9. I attended Stables at o'clock, at o'clock, and at o'clock, and saw Horses watered, fed, groomed, and bedded; stables cleaned; harness in good order. Horses health. Forage is of quality.

Wash House.

10. I visited the Wash-house at o'clock, and found it

Parades.

11. I attended the morning and afternoon Parades, and inspected the New and Old Guards, and found them

Tattoo.

12. I attended at the hour of Tattoo, when N. C. Officers and Men were reported

I have the honor to be, Sir,
Your obedient servant,

To the Adjutant.

(No. 358.)

Special to "A" and "B" Batteries, G. S.

9. He will ascertain that the N. C. officer in command of the guard can read the thermometer, and will direct him to do so at every relief; encouraging the sentries to observe and report on changes of weather appearance of aurora, the N. C. officer noting the same in his guard report. Habits of observation are invaluable to a soldier.

THE SURGEON.

1. The Surgeon has the entire charge of the Hospital and Sick of the Brigade, or Battery.

2. He will make arrangements for the inspection of the prisoners, daily, before morning parade and send a report, Regl. form 7, to the orderly room, before office hour.

3. He will also make a daily sick report, Regl. form 8, of such Officers, N. C. officers, and Gunners, as may have reported sick, noting in the report the disease, and whether the patients are treated in Hospital, or Quarters, or if to attend Hospital only.

4. He must make an inspection of health every fortnight, at such hour as may be fixed in orders.

5. He will always be present when the Battery turns out for parade exercise with ammunition.

6. It is expected that the Surgeon will communicate to the Commanding Officer any improvements that may appear necessary to be suggested, as regards the health and comfort of the men.

Special to "A" and "B" Batteries, G. S.

7. He will examine all recruits for "A" or "B" Battery and also the N. C. officers of the Militia Artillery joining "A" or "B" Battery, Gunnery School, for a short course, and ascertain that they are physically fit for service. He will keep a record, Regl. form 9, of the examination.

8. He will send to the orderly room for the information of the Commanding Officer, a report, Regl. form 10, of such examination.

9. When a recruit is accepted by the Commanding Officer, he is forthwith to be brought to the Hospital and will not receive his regimentals until he has thoroughly bathed, if that measure is deemed necessary. The Surgeon is responsible that this order is carried out, as far as the Hospital Staff is concerned.

PRISONERS MEDICAL INSPECTION REPORT.

CITADEL, QUEBEC,

187 .

<i>Rank and Name.</i>	<i>Surgeon's Remarks.</i>

Battery Orderly.

THE ADJUTANT.

1. The Adjutant must be particular in seeing the Standing Orders strictly adhered to, and having constant opportunity of observing everything connected with the corps, the Commanding Officer should desire, and has a right to expect, that he will on no consideration withhold from his knowledge any deviation from the established practice and orders. The Adjutant is to be considered as the voice of the Commanding Officer; all orders coming through him are to be implicitly obeyed by all ranks, as if given by the Commanding Officer in person.

2. He will take care that every man is well drilled, and that his position and carriage is soldier-like. Every extraordinary occurrence, either in barracks or in camp, must be noticed by him.

3. The drills and instruction of young officers and men, are under his immediate superintendence.

Special to "A" and "B" Batteries, G. S.

The special squads are under his supervision.

4. He is to keep all books and official papers, correspondence, roster of all duties, leave of absence, non-commissioned officer's seniority book, &c., correctly and in conformity with General Orders and Regulations.

Special to "B" Battery, G. S.

He will keep a record of all certificates granted and an efficiency book, into which the figure of merit of each officer, N. C. officer or gunner, at each drill will be entered after passing.

5. He will attend all courts martial, taking care that all lawful regulations on this head are attended to, and be prepared to act as prosecutor, to furnish all information that may be required by the court as to character, former convictions, age, length of service, &c., taking care that the prisoner is duly warned for trial, and furnished if he wishes it, with a copy of the charges, and informed that his former convictions will be brought in evidence against him.

6. He will attend all Commanding Officer's parades, receive reports from officers, tell off the parade and report to the senior officer present.

Special to "B" Battery, G. S.

7. The Adjutant will also act as Staff Officer to the Inspector of Artillery. He will supervise the clerk duties of the whole office; dividing the correspondence into the following heads:—

A. *Artillery*—All correspondence of the Inspector of Artillery and Commandant of Gunnery School, relative to Artillery matters, viz:—Drills of Artillery Militia corps, Inspections, promotions in B Battery and instruction of Officers of Artillery, &c.

B. *Battery*—Correspondence relative to "B" Battery, regarding supplies, pay, clothing, and Battery matters.

C. *Confidential*.

D. *Departmental* correspondence, relative to ammunition, armament, ordnance lands, fortifications, repairs to the same, and orders to R. A. agents.

THE QUARTER MASTER OR THE QUARTER MASTER SERGEANT.

1. All articles in store are in his charge and he is responsible that such articles are in the best possible state.

2. The necessaries are to be issued through him, under the directions of the Commanding Officer, and he will be responsible that they are strictly according to the Regimental pattern.

3. He will attend the Commanding Officer at all inspections of necessaries, arms, barrack rooms, harness, &c.

Special to "A" and "B" Batteries, G.S.

4. He will take care that every article of appointments, necessaries, &c., is properly marked before delivery and that the proper charge for that purpose be recovered from those concerned.

5. He will attend the delivery of bread and meat and see that it is good and of full weight.

6. He is responsible that the arms, accoutrements and clothing of any man, deserting, going into hospital, or in case of any casualty by death, are immediately taken an account of and received into store. He will also take into store the necessaries, &c., of men sent to prison, and such articles as men do not take on pass or furlough, kits belonging to men who go on pass or duty, by which they will be absent for more than three nights, are to be given in store before the men quit the barracks.

7. All articles lost or broken at exercise, and not reported at the time as broken, lost, or damaged, will be considered as chargeable to the senior present.

8. He is to make frequent inspections of the Barrack rooms, stables, utensils, &c., in which all deficiencies must be accounted for, in order that at the monthly inspection the charges to be made may fall upon the person through whose neglect or carelessness the damage was done.

9. He must be particular, in tracing to individuals all damages and losses, or when they can not be traced to individuals, then to rooms, or stables. Pains must be taken to guard against settling those matters, by dividing the charge against Batteries generally. He will be assisted in his duty by the Nos. 1 and non-commissioned officers in rooms and stables.

10. He will take an exact account of the distribution of the Barrack bedding, and in the event of any being lost, will be prepared at once to name the individual who lost it, against whom it will be charged; on no account will the loss be allowed to become a charge, generally, against the respective Batteries.

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11. He is responsible that the precincts of the Barracks, Huts, Stables, or Tents; also the Latrines, ash pits drains, wells and watering places; are kept clean.

VETERINARY SURGEON OR FARRIER SERGEANT.

1. He will communicate with the Commanding Officer on the state of the stables, ventilation, quality of forage, sick horses, duties of the shoeing smiths, &c.

2. He is to visit the stables whenever required to do so by the Commanding Officer, and will always attend him when he visits the stables.

3. He will attend all general parades.

4. He is to be responsible for the tools, shoes, nails, and other stores belonging to the shoeing smiths, and report their state to the Commanding Officer.

5. Whenever it is necessary to perform any operation, he will previously make a report to the Commanding Officer, and have the farriers present when he operates.

6. He will not on any account interfere with the interior economy or disposition of the horses without the express sanction of the Captain of the Battery.

SHOEING SMITHS OR FARRIER OF FIELD ARTILLERY.

1. They are to observe implicitly the instructions given to them by the Veterinary Surgeon or Farrier Sergeant.

2. They are to go round their sub-divisions every morning at stable hour and examine their horses' feet, and report to the farrier that they have done so, at the same time reporting any sickness or casualty they may remark among the horses to the farrier and to the No. 1 of the sub-division.

3. They must be particularly careful that they never lose their temper so as to strike any horse they may be shoeing or examining.

MASTER GUNNER.

Special to Quebec, G. S.

In the absence of Commissioned Officers, the Master Gunner is the responsible military authority. He has charge, under the officers of the sub-districts, of the stores in the Garrison. Has charge of the Armament and Artillery Store ledger; makes out requisitions for stores required out of, or returned to store. Performs the duties of clerk in Departmental correspondence (marked D.) of Inspector of Artillery, connected with the Armament, Lands and Fortifications. Has charge of workshops, and will check the accounts of the Tradesmen who supply material for use in them, before submitting them to Inspector of Artillery. Has charge of the meteorological instruments, compiles returns, and submits them to Inspector of Artillery, before transmission to Toronto observatory.

BATTERY SERGEANT MAJORS.

1. The executive part of the interior economy of Batteries depends upon them, and from their constant presence with their Batteries they have the opportunity of observing and checking all irregularities.

2. They are responsible that the Standing Orders, both in regard to themselves and every non-commissioned officer, gunner and driver in the Battery to which they belong, are strictly adhered to.

3. The situation of a Battery Sergeant Major is one of high respectability, but it depends on their assiduity and character, whether or not they meet that attention the appointment entitles them to.

4. They must be able to instruct the Battery in all details of Artillery drills, both mounted and dismounted.

5. At all drills they are answerable for the appearance of men and horses.

6. It is their duty to pay the greatest attention to their Battery stables, the shoeing and everything relative to horses.

7. They are answerable to the officer commanding the Battery for the accuracy of the Battery reports, and for the appearance of men and horses upon all parades, and the cleanliness and order of the rooms and stables.

8. At Watering and Exercising Orders they will ride in rear of the Battery, taking particular notice of the men's riding and their general attention to the leading of spare horses, &c., reporting to the Orderly Officer any irregularity.

9. All passes for non-commissioned officers and men are to be signed on the back by the Battery Sergeant Majors previous to being submitted to the officers commanding Batteries.

10. They will attend at the Orderly Room when prisoners are disposed of, and enter in their Squad Book the amount of punishment awarded in each case.

11. The Battery Sergeant Major is to keep a roster for the duties of all N. C. officers, detail all duties and give out the daily orders to the Battery Orderlies.

12. He must keep a list of all defaulters and see that they attend regularly the fatigues ordered.

13. He will be responsible for the committal and release of all prisoners to and from the guard room or cells.

14. He is to parade all guards and orderlies, carefully ascertaining that they understand their orders. Mounted orderlies are to report to him on their return.

15. He will call the roll at tattoo and report to the orderly officers. (In Brigade will see that the Batt. Serg. Majors perform their duty.)

16. He will visit the guard room or tent frequently. See that it is in good order, and that a list of all men confined to Camp or Barracks is kept therein.

17. He will be particular in noticing that the sentries perform their duties correctly, and that the relief is properly conducted.

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Parade all prisoners for trial and the escort and witnesses, and will also furnish a list of all prisoners confined in the prisoners room, main guard or police station, to the Adjutant every morning.

In Brigades of Artillery the above duties from paragraph 12, etc., are performed by the Brigade Sergeant Major.

ORDERLY ROOM AND COMMANDANTS' CLERKS

Are under the direction of the Commanding Officer or Adjutant, and the situation they hold is one of great responsibility.

2. The greatest secrecy must be observed by them and their assistants, not only with respect to official books and documents, but to everything that takes place in the Commander's Office or Orderly Room.

3. They are responsible that no book or document is taken out of the office without the Commanding Officer's permission.

4. They must at all times appear in uniform, and their dress must be strictly in accordance with regulation.

EXTRA DRILL, NON-COMMISSIONED OFFICER OR PROVOST SERGEANT.

1. He is to superintend the defaulters at fatigues and punishment drills, at such hours as may be ordered.

2. When the defaulters are ordered on barrack fatigue he is to see that they continue actively employed, and prevent unnecessary speaking.

At drill he is never to suffer a defaulter to hold conversation, not even when standing at ease (which they are permitted to do twice during the hour).

Any man attempting to break this order is to be reported to the Adjutant.

3. When he has been employed with defaulters during the forenoon he will be excused attendance at mid-day tables, but not otherwise. He will attend the parade for defaulters before watch-setting.

4. He is at all times to have in his possession a list of defaulters, which will be furnished by the Orderly N. C. O., showing the dates on which each man's punishment commenced and that on which it will terminate.

5. The circumstances of the Canadian Militia necessitate that defaulters should be employed in the necessary fatigues about camp or barracks, such as cleaning latrines, sawing wood, shovelling snow, &c., never at extra drill or shot drill.

NOS. 1, OR NON-COMMISSIONED OFFICERS IN CHARGE OF SUB-DIVISIONS.

Nos. 1, of sub-divisions are immediately responsible to their own divisional officers, that the carriages, ammunition, horses' appointments, men's necessaries, and everything under their charge are complete and in the best possible order. They must have in their possession a squad book which is to contain a list

of men, horses, equipment, stores, in fact of everything that is under their charge; and also is to contain all duty rosters, and other details connected with their sub-divisions.

2. They are responsible that the beds, kits, and necessaries are put up in a proper and uniform manner, that the men change their linen twice during the week, that their hair is cut according to order, that they are cleanly in their persons, and that no bad language is used about the rooms or stables.

3. They will send in a weekly report at noon stable hour on Sunday to the officer in charge of the division, that they have performed all the duties laid down for them in the Standing Orders, or otherwise.

4. They must make themselves acquainted with the character and abilities of their non-commissioned officers and men, take every opportunity of instructing the younger non-commissioned officers in their various duties, and be most particular that they on no account associate or drink with the men, as such conduct tends to weaken their authority, and renders it almost impossible for them to conduct their duties in a proper manner.

5. They are responsible that the arms, accoutrements, and clothing of every man deserting, going into hospital or prison, or in case of any casualty by death, are immediately taken on account of and given into store.

6. They must pay the greatest attention to the shoeing and everything connected with the horses of their sub-divisions. Every horse is to be shod or the shoes removed at least once a month, and a shoeing list will be kept by them, specifying the date on which each horse was last shod.

7. The recruits and young non-commissioned officers must be instructed in the manner of taking to pieces and putting together every part of their appointments.

8. The saddles, harness, bridles, and other appointments, are to be hung up in a uniform manner. Whether they have been used or not, they must be taken down every day and cleaned.

9. The appointments are to be taken to pieces once a week, and laid out for the inspection of the officers in charge of divisions. The ammunition and small stores (weather permitting) must be taken out of the boxes once a week, and thoroughly inspected, care being taken that each box contains the proper articles assigned to it.

10. When squad parade sounds, each No. 1 will parade his men in front of his sub-division stables and inspect them; he will then march them into stables and file every man to his horse or horses, go round, inspect every horse and point out everything that may be wrong, and have it altered on the spot. He will then mount his men, and see that the stirrups and drivers' reins are of a proper length, the horses properly girthed up, and that the surcingles are not tighter than the girths; neglect of this important point produces lumps and galls, and many horses are thrown out of work for a time by want of attention to it.

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11. He should be particular that the short pieces on the leading reins are of such a length that when the drivers are mounted, the leading rein should have an equal bearing on each side of the hand horse's mouth; and that it is fastened on the top, centre, or bottom bar of the bit, according to the mouth and temper of the horse.

12. He should see that the saddles and pads are properly placed on the horses' backs, and see that the front straps of the girths if anything are fastened tighter than the rear ones, this will in a great measure prevent saddles and pads working forward as they are so apt to do from exactly the opposite being the case.

13. They must see that the side and bearing reins are dispensed with when practicable and are not too tight when used, that the curbs are flat and smooth, and will allow the play of a finger between it and the horse's jaw.

14. When marched to the gun park they will be most particular that the horses are properly hooked in; the main points to be attended to being, that the traces are not twisted and hooked in of unequal length, the hand horse, if anything, the longest, that the breechings have no more play than 4 inches between them and the collars, and are from 10 to 12 inches below the upper part of the dock; that the thongs are properly fastened, and that each driver has a spare set on the off ring of his saddle.

15. In marching to the drill ground, or in route marching, Nos. 1 should be continually looking round to see that the line of draught is straight, the drivers sitting up paying every attention to their horses, and correcting anything that they may not have seen when inspecting their sub-divisions in the park.

16. When halted, they must see that the drivers examine their horses' feet, shoulders, girths, saddles, &c., and report to them all correct or otherwise, and they will themselves report to the officer in charge of the division.

17. On coming in from drill or marching order, or from the line of march, as soon as the horses are filed into stables and fastened up, the men will be allowed 10 minutes to change their things, at the expiration of which time the Nos. 1 will then parade the whole of his sub-division off duty, and march them into stables, where they will remain, and on no account quit the stables without leave until the "turn out" sounds.

18. Sick or lame horses under treatment in stables must be pointed out to the stable orderly, so that he may see that the orders of the Veterinary Surgeon or Farrier are carried into effect.

19. They will most carefully inspect and pass at morning and mid-day stable hour, every horse under their charge, and report accordingly, finished, &c., or otherwise. They must not only be vigilant themselves, but impress upon all non-commissioned officers and men under them, the necessity of reporting at once any horse that may appear dull or the least off his feed.

20. They will see that the wheels of their carriages are properly greased, and are always fit for service.

Special to "A" and "B" Batteries.

21. He will keep the messing account of his sub-division in a book provided for that purpose, making up the accounts every week. This book to be sent to the officer in charge of the division, who will examine and initial it and forward it to the Captain for approval.

22. They are to take frequent opportunities of instructing their men in the duties of artillery men, as they will be held responsible that the whole of them are instructed in the tables and rules of practice, and that they may be able to lay their guns with the greatest precision for all distances, and in the shortest possible time.

MOUNTED ORDERLIES.

1. They will always parade in marching order unless otherwise ordered.

2. The credit of the Regiment is vitally affected by the conduct of Men or Non-Commissioned Officers on mounted orderly duty, therefore no irregularity, however trifling, or slovenliness in an orderly should ever be overlooked or escape punishment.

3. When an orderly is required to "turn out," be it by night or day, he must do so with the greatest smartness, and will, unless otherwise ordered, proceed at once to the Brigade or Battery Sergeant Major, who will give him his orders.

4. A Mounted Orderly is on no account to stop on his road for any cause whatsoever, neither is he to carry other than the message or letter committed to his charge, which he is to deliver to the person to whom it is sent or to a trustworthy person deputed to receive it.

5. Should a Mounted Orderly have no answer to bring back he will obtain a receipt for whatsoever he took, on which must be stated the hour at which he arrived and that at which he left on his return.

6. A Mounted Orderly is never to exceed six miles an hour unless ordered to do so. To accomplish this he must trot a mile, then walk a quarter of a mile, and so on. If ordered to travel at the rate of five miles an hour, he will walk and trot a mile alternately. Returning home without an answer in fine weather will be done at a walk; in bad weather at the rate of five miles an hour.

NON-COMMISSIONED OFFICERS AND MEN, IN GENERAL.

1. The excellency of a Brigade or Battery depends in a great measure, on the conduct of its non-commissioned officers; from them is expected the strictest attention to all their duties, the greatest sobriety and regularity of conduct, and attention to dress and appearance. They must insist on strict and prompt compliance with their orders, but at the same time use authority with discretion, and never allow themselves to be influenced by prejudice or personal ill-will towards any individual.

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2. Non-Commissioned Officers should be perfectly acquainted with all drills.

3. Any man found on parade, with a muzzle stopper in his rifle, will immediately be reported.

4. N. C. Officers and Men must be very particular in saluting officers, in uniform or otherwise.

5. Men reported by the medical officer for concealing venereal disease will be severely punished.

6. All business is transacted in the Office, and the Commanding Officer can be seen there at office hour, for all necessary purposes.

7. N. C. Officers and Gunners are to be careful to give the proper salute to officers of the British and Foreign armies or navies, when recognisable as such, in uniform. Guards and sentries will pay the proper compliments to those officers.

8. No gunner will be promoted to the rank of N. C. Officer unless he is in possession of a Gunnery Certificate, and Non-Commissioned Officers, not having in possession the above certificate, are to qualify as soon as possible, in order to obtain subsequent promotion.

9. Non-Commissioned Officers must exact attention, obedience, alertness, and precision in all movements and drills, giving their words of command in a decided and commanding voice.

10. Non-Commissioned Officers are never to make use of coarse, or intemperate language towards the men; they are to give their orders plainly and decidedly, in as few words as possible.

11. They must reflect that example is better than precept, therefore it becomes their interest as well as duty to be correct in their own conduct.

12. When a soldier speaks to an officer he is to stand at attention, as on parade, having saluted the officer on approaching him. When he comes into a room he is to do the same and not take off his cap or busby.

13. When passing an officer he will salute with his outward hand to his cap, looking the officer in his face whilst passing him.

14. When in a Civil Court, and before a Magistrate, soldiers not under arms must remove their caps.

15. Soldiers are expected to be civil and courteous in their behaviour to all classes of society.

16. All good soldiers will, for their own credit, be obedient to their officers, attentive to the care of their arms and accoutrements, as well as exact in the discharge of their duties, and always neatly and regimentally dressed; by these means they will show to their officers that they feel an interest in the credit of the corps, which will secure them every proper indulgence, comfort, and advantage which their situations can afford, and preclude the necessity of that most painful part of an officer's duty, the inflicting of punishment on those whom they only wish to benefit as their comrades in arms.

17. Non-Commissioned Officers are recommended to be active and zealous in their duty, as it will ever be a rule to advance those whose qualifications entitle them to promotion, in preference to those who (though of longer standing in their respective ranks) do not display the same degree of merit.

18. Seniority alone can never give a Non-Commissioned Officer right to promotion, but when his merits are equal to those of his opposing candidates, it will secure him from being superseded by a junior. On the other hand, when a Non-Commissioned Officer is discovered to have become careless, negligent or indifferent in the discharge of his duty, whatever his rank and services may be, he can never expect preferment to the prejudice of the service.

19. No one should be recommended for promotion (particularly to the rank of Sergeant) who after examination is wanting in merit, and in the essential qualifications necessary for a due and efficient discharge of his duties. The Gunnery Schools afford every facility to those who are anxious and willing to qualify for promotion.

20. The position of a Sergeant of Artillery is one of such importance as to require great intelligence for a proper discharge of his various duties, from constant liability to be placed in responsible situations.

21. No party will ever be sent out on duty, except in charge of a non-commissioned officer.

22. No man in the sick report is to quit the barracks, or camp, or enter the canteen.

23. A soldier who is not properly dressed, or without his cap, is on no account to salute; he is to stand at attention till the officer passes. The same rule is to be observed by a soldier who may be carrying anything that prevents him from saluting properly, if walking he will turn his head slightly towards the officer in passing. When individual soldiers meet a column of troops on the march, they are to salute the Commanding Officer and the colors in passing. Non-Commissioned Officers in command of parties armed or unarmed are to pay the proper compliments when passing officers in uniform.

24. No Non-Commissioned Officer or soldier present with a battery is to address an officer in writing on any subject connected with duty.

RULES FOR THE INFORMATION AND GUIDANCE OF YOUNG SOLDIERS.

1. The first duty of a soldier is to obey orders. If he thinks himself aggrieved in any way, or that he has received an unjust order, he should obey the order, and afterwards represent his case to his Commanding Officer when the matter will be investigated.

2. If a soldier has a complaint to make either as regards his pay, messing, or on any subject, he should make it when the officer on duty visits the Barracks at dinner time. It is for this purpose that the men are asked if there are any complaints.

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3. Should a soldier wish to see an officer on any subject, he should ask to do so through the Sergeant Major, or a N. C. Officer.

4. If soldiers make frivolous or unnecessary complaints they are liable to be punished.

5. No man can obtain a *pass* until he has been dismissed his Marching Drill.

6. No soldier is to leave Camp or Garrison unless he has been granted a *pass* for that purpose, and which he must have in his possession, otherwise he is liable to be made a prisoner for absence without leave.

7. All soldiers going on *pass* must be properly dressed. Gloves are to be worn and not rolled up in a bundle and carried in the hand.

8. No soldier should be more than five miles from his quarters without a *pass*.

9. Soldiers are not allowed to smoke in the streets.

10. No soldier is allowed to lend any article of his regimental clothing, &c. to another, nor sell or exchange any of his clothing or kit without permission.

11. No soldier is allowed to alter, or have altered, any part of his regimental clothing, except with the sanction of the Commanding Officer.

Special to "A" and "B" Batteries.

12. A soldier is told off as Cooks-mate in each room, during the time he is on duty as such, he is responsible that the room is locked and the ventilators open while the men are on parade, he is responsible to the N. C. O., in charge, for everything in the room or belonging to it. He must not leave the room more than is necessary for the performance of his duties, and should he see any irregularity he should at once report it to the N. C. O.

FIELD ARTILLERY.

STABLE DUTIES.

1. Nothing is more important than the horses being in good condition, and at all times fit for immediate service; the stable duties will therefore require the greatest attention to the quality, quantity, and distribution of the forage, as well as the vigour and exertion with which the grooming is performed; these are subjects that require from every officer and non-commissioned officer the strictest attention.

2. Great care must be taken that the horses are properly watered, without which they cannot possibly be kept in good condition. Every horse should be allowed as much as he will drink, excepting when brought in heated or over fatigued, at which time they should be sparingly watered; but at the next stable hour they should not be stinted. Non-commissioned officers must look carefully after young soldiers in this matter.

3. The following routine will be gone through daily at stables: On the trumpet sounding for morning stables, the men will fall in by squads, the roll called, then march to stables, litter up, and sweep down, commence grooming off side, then near side, "heads about," clean eyes, nostrills, &c., sweep down, clean headstall; feed with corn when trumpet sounds.

4. On the trumpet sounding for mid-day stables the men go immediately to their horses, the non-commissioned officers go round their squads to ascertain whether all are present, pick out and wash horses' feet, &c., "heads about," "collar up," groom body and legs, feed with hay (no man to leave off grooming till permitted by the non-commissioned officer to do so,) sweep down; feed with corn when trumpet sounds.

5. At evening stables water and feed with hay, dress, &c., then litter down, feed with oats and hand-rub legs (principally hind ones) for quarter of an hour, litter down for the night.

6. Horses not present at the appointed stable or feeding hours, are not to have a double feed of oats, if there be time to divide it before they are bedded up for the night.

7. When men come in with their horses, and they have not had their meals, they may be permitted to quit the stables for half an hour, leaving their horses harnessed until they return; they are first to take off the bridles, put on collars, throw up cruppers, wisp their head and legs, pick and wash their feet, and feed with hay. On their return to the stables the horses are to be watered, and fed with oats, and the harness taken off, and horses and harness thoroughly cleaned.

8. A couple of hands full of chopped straw and hay to be given mixed with each feed of corn.

9. No man is to take a horse outside the stable to groom him, unless ordered by an officer to do so.

10. On no pretence is a horse to be struck in the stable, or quickly turned round in the stall.

11. Smoking at stables is strictly prohibited.

12. The saddles and bridles, harness, and other appointments, are to be cleaned daily and hung up in a uniform manner.

13. The stable utensils are to be carefully arranged in the most convenient places, pitch-forks especially are not to be left in places where they are liable to injure horses. The wheelbarrows are always to be emptied before the men are dismissed from stables.

14. Non-Commissioned Officers in charge of stables are to be most particular in observing that the horses are all let down from the rack before quitting stables.

15. One stableman is always to be in the stables. The cook of his room will bring him his meals. In case of any accident he is to pass the word for assistance to the nearest barrack room.

PARADES.

The following orders for trumpet parade calls are laid down: All mounted parades, except riding drill and watering order, the trumpet is to sound "Boot and Saddle" 60 minutes

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before the hour of parade; 15 minutes afterwards "Squad Parade," and 30 minutes after "Boot and Saddle" the "Turn Out."

2. The sound "Boot and Saddle" does not imply that the horses are not to be harnessed and saddled until that sound; it is meant more as a warning to all hands that it is half an hour to turn out and a quarter of an hour to squad parade, harnessing and saddling must always depend on circumstances, and special orders must always be given concerning it. Horses should never be harnessed before it is absolutely necessary.

3. Subaltern Officers "turn out" when the trumpet sounds "Turn Out" for the men half an hour before the time named for parade, and immediately begin their inspections, at the same time the Nos. 1 are inspecting; if they do not do this the battery can never be properly inspected, and ready at the hour named.

4. For foot parade, batteries will fall in for "Squad Parade" 30 minutes before the hour named, "Fall in" to sound directly after the Nos. 1 have inspected their sub-divisions, and the battery to be told off in divisions ready for divisional officers' inspection, 15 minutes before the hour mentioned.

ORDERS FOR STABLE GUARD.

1. The stable picket will mount at "turn out" of stables, having been allowed to leave stables a quarter of an hour before turn out, to dress themselves.

2. They must remain constantly on their post, but not go into the stables without a light, which must be in a lantern. Should a horse get loose, they must call the non-commissioned officer of the guard.

3. The picket will be dismissed at morning stable hour by the non-commissioned officer in charge.

GUARDS AND PRISONERS.

1. The guard must be most alert and vigilant in the performance of their duties, and ready to turn out at a moment's notice; they will not on any account take off their accoutrements.

2. Sentries are on no account to be allowed to relieve one another without the presence of a non-commissioned officer; any non-commissioned officer allowing such a practice will be brought to a court martial.

3. When a soldier is made a prisoner, his crime is to be given to the non-commissioned officer of the guard, signed by the person who confined him.

ORDERS FOR THE MARCH.

1. There is no time when a Battery requires so much attention and vigilance on the part of the Officers, Non-Commissioned Officers and Men, as on a march.

2. Immediately a battery receives the order to march, the subaltern Officers will furnish the officer commanding the battery with a distribution return of their respective divisions, detailing the men and horses to march as well as the dismounted and sick men. The Assistant Surgeon will send in a return of men unable to march.

3. On the night previous to marching, the Quarter Master Sergeant will have the whole of the barracks, stables, or camp fires, &c., cleaned and placed in good order, so as to expedite their being given over the following morning, which will be done in the presence of an officer of the battery.

4. Every battery when not marching with other troops should have an advance and rear guard.

5. The head of the column should be occasionally changed, a different sub-division leading, this tends much to relieve horses. A uniform pace should be observed by the leading division.

6. The battery should be halted shortly after marching, and again every 4 or five miles, when the men should be dismounted, horses, harness, &c., examined.

7. Gunners and Drivers must report the slightest appearance of a gall or chafing by any part of the harness.

8. Officers commanding divisions will not quit them until men and horses are accommodated on the line of march; they will see that the men do not lounge in their saddles, this habit being the cause of many sore backs.

9. Should the march be long, a feed of oats may be carried in the nose bags.

10. Farriers to carry spare shoes and nails in their holsters.

11. When a man has cleaned his horse, harness and appointments, he must clean himself.

12. The Orderly Officer will receive the reports at every stable hour and at tattoo from the Sergeant Major, and will visit the guard after tattoo.

13. On passing through or arriving at a military station, a report should be made to the Commanding Officer.

14. On the arrival of a battery where there is no camp ground or barracks, the Commanding Officer, previous to dismissing the parade, will inform the officers at what time the Nos 1 are to attend at head quarters to accompany the Commanding Officer round the different billets of their sub-division; this is usually about two hours after arrival.

15. On arriving at the stables, bridles, cruppers, and kits are to be taken off, girths slackened, mouths washed out only, feet washed, eyes and nostrils spunged, and then fed. Saddles not to be removed, or the horses watered until the arrival of an officer, who will examine carefully their backs, shoulders, &c. He will also ascertain whether the forage supplied is of good quality. Should the horses be too much crowded, he will get the billets exchanged or some of the horses removed to other stables.

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INSTRUCTIONS FOR BILLETING WHEN THERE IS NO CAMP GROUND OR BARRACK.

1. The day before the march of a battery or batteries, a Non-Commissioned Officer and a man from each division should be sent on to get billets; the Senior Non-Commissioned Officer being furnished with the route and a copy of the Mutiny Act.
2. When more than one battery is marching, the Senior Non-Commissioned Officer to take charge of the whole party.
3. Before starting, this Non-Commissioned Officer must ascertain at what hour the battery will march; and have a return of the officers, men and horses by sub-divisions, also the number of carriages.
4. On arrival, he will at once see the Mayor or Magistrate, have the route signed by him, draw billets for his party, and have the horses put up.
5. If it is a military station, he must report his arrival to the officer commanding.
6. He will get the number of billets required without loss of time, ascertain the situation of the lock up, making arrangements regarding it if necessary, and find out where the guns can be parked.
7. He must take care that the men and horses are quartered together by sub-divisions as much as possible, and that each division, should the town admit of it, be billeted in a separate district. In no case should a soldier be separated from his horse.
8. The Staff Sergeants, Trumpeters and Artificers, should have their billets as near head quarters as possible. The Non-Commissioned Officers are to be distributed amongst the billets so that two do not occupy the same.
9. The Non-Commissioned Officer will inspect all the billets, marking the number of horses on the stable doors with chalk, and inform the landlord of the probable time of the arrival of the battery, and of anything that may be required in the way of bales or means of fastening up the horses.
10. He will prepare a billet roll of the whole battery for the Commanding Officer, divisional ones for Subalterns, and sub-divisional ones for the Nos. 1. The names of men and number of horses for whom each billet is intended is to be written on the back of the billet paper.
11. He will call at the post office and receive any letters for the battery.
12. He will meet the battery before it enters the town, deliver the billet rolls detailed in paragraph 10.
13. The Quarter Master Sergeant will be held responsible that the billets are all paid, and obtain a receipt from the proprietors of the different billets.
14. The carriages should, if possible, be parked in barracks and a guard mounted over them; should there be no barracks, they are usually placed in the market place or other convenient spot; in this case a guard room may be hired. The lynch pins and washers should never be removed and the sentry specially ordered to see that they are not.

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OFFICERS OF ALL ARMS ATTENDING GUNNERY SCHOOLS FOR
INSTRUCTION, OR ATTACHED FOR DUTY.

Special "A" and "B" Batteries.

(1.) Neither Short-course officers, nor those who have been admitted in virtue of G. O., 20th October, 1871, to "A" and "B" Batteries Schools of Gunnery, and who may have been retained for duty after the expiration of the Long-course of Instruction, are entitled to pay while on leave of absence.

(2.) Short-course officers of all arms, attending the Gunnery School, are reminded that they may, for instructional purposes, be put on duties pertaining to a rank inferior to that they hold in the militia, but they do not lose their rank. They cannot exercise command in "A" or "B" Battery, neither are they to award punishment; but, in cases brought to their notice, they will report to proper authority for disposal.

(3.) The senior Short-course officer present is responsible that the Short-course officers of all arms are present on parade. He will, if no commissioned officer of the Gunnery School be present, hand them over to the N. C. Instructional Staff for drill, &c., and dismiss them himself at its close. Short-course officers are not to be put on orderly or other duties for instruction, except by special orders of the Commandant, and in no case before they have been sufficiently grounded in drill, &c.

(4.) All officers undergoing a course of instruction are to attend all drills and the lectures given to their squad.

(5.) Officers of Garrison Artillery, on first joining, are to go round each district twice with the officer in charge, and officers of all arms are to accompany the orderly officer for the first tour of duty.

SERVANTS AND GROOMS.

(1.) The allowance paid by officers to gunners acting as servants and batmen, is \$2.50 per month. They are not to appear in mixed dresses, but either in uniform or livery. They are not to be absent from Roll Call without a pass, signed by their master. They are at all times to have their uniform and accoutrements, &c., complete and in good order. When a servant is returned to duty, a report should in all cases be made to the Adjutant for the information of the C. O.; and a servant dismissed for mis-conduct by one officer is not to be taken by another, except at such interval as the Commandant may direct.

T. B. STRANGE, Lt.-Col.,
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ADDENDA

To paragraph 5 on "Extra Drill, Non-Commissioned Officer or Provost Sergeant," page 19, of "Extract from the Manual for the Militia Artillery of Canada, Part I, Section III, Discipline, Standing Orders, Stable Duties, &c.:"

"Men should as seldom as possible be made to feel drill a punishment, and it should be rarely resorted to, only in exceptional cases at the discretion of the Commanding Officer."

